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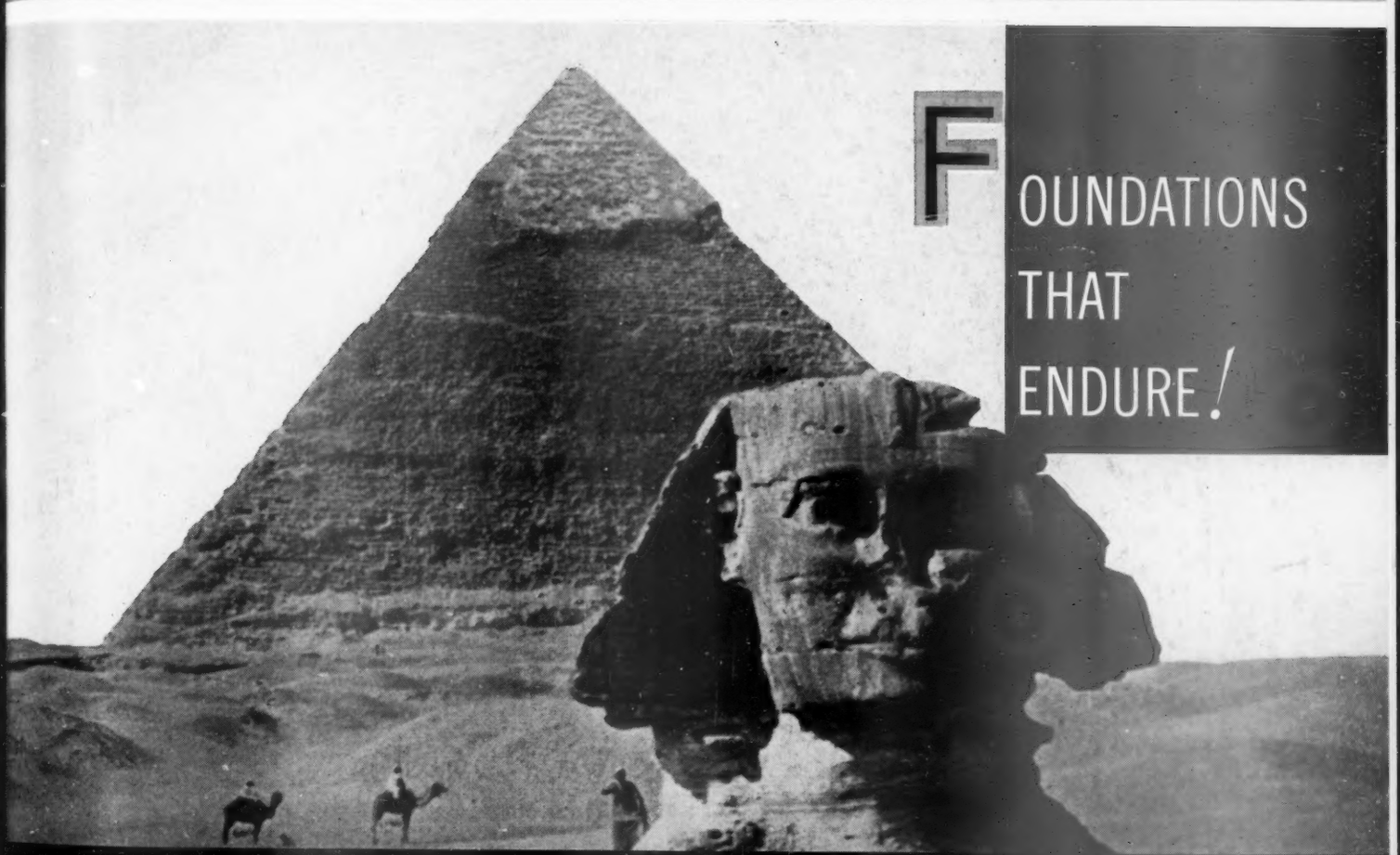

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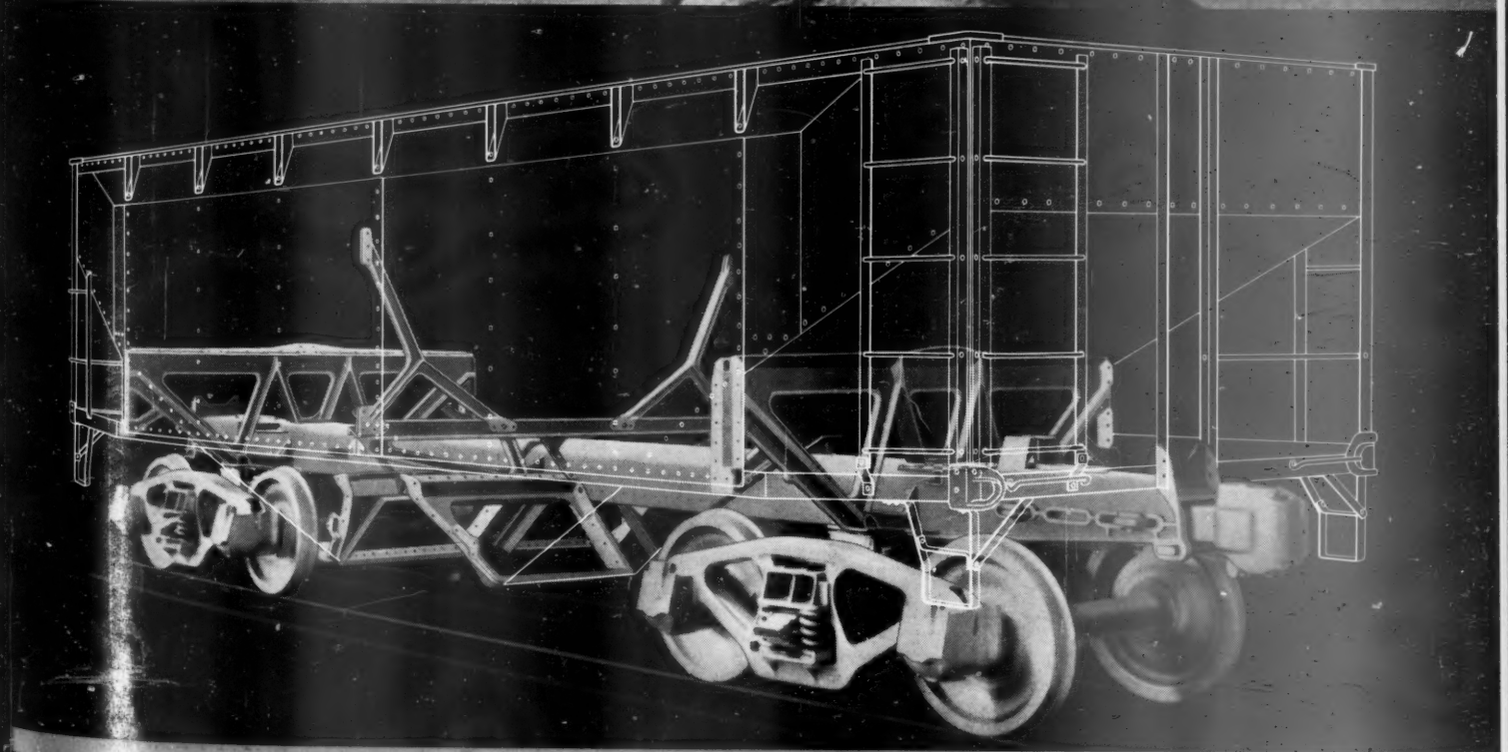

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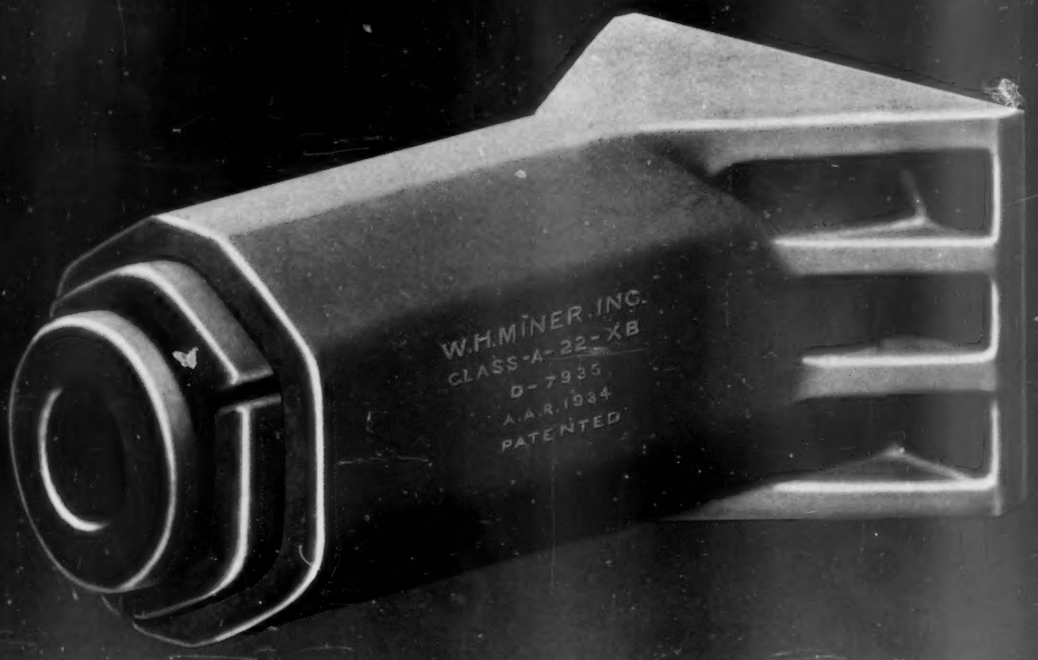

High capacity and endurance for heavy locomotives

W. H. MINER, INC. CHICAGO

Published daily by Simmons-Boardman Publishing Corporation, 1309 Noble Street, Philadelphia, Pa. Entered at second-class matter, January 4, 1933, at the Post Office at Philadelphia, Pa., under the Act of March 3, 1879.

Railway Age

DAILY EDITION

VOL. 102 JUNE 21, 1937 NUMBER 25A

PUBLISHED SIX TIMES IN JUNE BY THE
SIMMONS-BOARDMAN PUBLISHING CORPORATION
1309 NOBLE STREET, PHILADELPHIA, PA., WITH EXECUTIVE AND EDITORIAL OFFICES AT 30 CHURCH STREET, NEW YORK, AND 105 WEST ADAMS STREET, CHICAGO

Other Offices at
TERMINAL TOWER, CLEVELAND
1081 NATIONAL PRESS BUILDING, WASHINGTON
1038 HENRY BUILDING, SEATTLE
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The Railway Age is a member of the Associated Business Papers (A.B.P.) and of the Audit Bureau of Circulations (A.B.C.)

"Parasite Load"

Extra power requirements of the locomotive caused by air conditioning and other train power requirements, are often referred to by those who do not like it, as "parasite load." It takes, they say, as much as one-tenth of the power required by a ten-car train, and if we are going to hold our present schedules, let alone increase them, we will have to cut down the number of cars in a train accordingly.

Several of the recently built streamliners have been equipped with a power car for supplying electric power to the train. The net result of this procedure is much the same. The car develops the required power, but it must be hauled by the locomotive.

But is anyone going to lend a really sympathetic ear to those who don't like it? Air conditioning is an established service and other requirements for power—principally lighting—are growing and are not to be denied. A number of the new trains are lighted so well that people talk about it as something particularly well done. They find also that they can read in comfort without undue fatigue. Lighting standards are going up and the hand of the railroads will be forced by competition, if they do not take the initiative. There are many buses now in operation which are better lighted than the average railroad car.

In some instances good lighting—seven to eight foot-candles—has been achieved with a power consumption which does not greatly exceed that formerly used to produce less than three, but the total demand for train power is tending upward and it seems probable that the railroads will do better to find ways to produce it, rather than to find excuses or objections for not doing so. As a matter of fact, most roads have tacitly conceded to the new requirements and it remains to determine by what means the required power can most effectively be developed. The Association of Railway Electrical Engineers is now studying ways and means of improving the situation. This body has long been effective in doing this sort of ground work and it will undoubtedly be able to help materially in showing what methods the railroads should pursue to meet most effectively the new demands for train power.

Air Brake Meeting

The Air Brake Association, with a distinctive record of achievement in the past, held a two-day business session at Haddon Hall which compared favorably with some of the most constructive previous programs. About 80 air-brake supervisors, engineers and others concerned in the development, operation and maintenance of air-brake equipment were present at the opening session Thursday morning, and the program included seven papers on subjects of marked current interest and importance.

It has been seven years since the last annual meeting of the Air Brake Association, held at Chicago in 1930, and the intervening years have brought many changes in air-brake appliances and practices which have an important bearing on the efficiency of railway operation. Problems introduced by these changes in air-brake equipment, as well as drastically altered operating conditions, can best be solved only by combining the knowledge of men with long specialized experience, and the renewed activity of the Air Brake Association is, therefore, a hopeful augury for improved train braking conditions in the future.

The practical application of information developed at the meetings of the association is typified by the discussion of the paper on air-compressor lubrication. Air compressors receive more abuse than almost any other device used on a locomotive, due to more or less unavoidable operation for considerable periods of time with entirely inadequate or perhaps even no lubrication. This subject was discussed in detail and equipment and operating methods suggested which promise to effect large economies in compressor maintenance as well as to assure longer service life, reliability and freedom from lubrication failures.

Another subject with an important bearing on opera-

tion which was presented before the association was the question of the proper design, inspection and maintenance of the lowly brake beam and its suspension parts. In discussing this subject President W. H. Clegg said: "The failure of brake-beam suspension parts on cars in interchange seems to be one of the most troublesome mechanical defects with which we have to deal." With the present emphasis on high-speed on-time freight-train performance, the many serious train delays due to brake beams falling down because of excessive slack and wear in suspension parts cannot be tolerated. The Air Brake Association has an important function to perform in cooperating with committees of the Mechanical Division at present actively engaged in developing regulations for closer inspection, restricted tolerances of wear and slack and better maintenance which will assure greater freedom from expensive interruption to freight-train movements in general.

Purchases and Stores Division

The Purchases and Stores organization which opens its annual convention in Atlantic City today is one of three divisions of the department of maintenance and operations of the Association of American Railroads. The other two divisions are the Mechanical, which is also meeting at Atlantic City this week, and the Engineering division. Prior to 1936, when the Association of American Railroads was formed, the organization was Division VI of the American Railway Association, which was formed in 1920 when the railroads were returned to their private owners after the War. Before that time the organization was known as the Railway Storekeepers' Association, a body which was organized in 1904. While this is only the second meeting of the Purchases and Stores organization as a division of the Association of American Railroads, it is the sixteenth meeting since it became a part of the A.R.A., and the thirty-second meeting since the storekeepers first organized.

The organization thus has had an extended service record, during which a great many questions, problems and conditions have received its attention. Methods of storing and caring for different kinds of material, specifications for printing, methods of purchasing equipment, practices of ordering and handling material, control of inventories and the reclamation of old material are only samples of the subjects investigated by the division, which has also adopted a large body of recommended practices directed to promote efficiency and economy in transportation.

It is an interesting fact that the importance of organization for railway purchasing and storekeeping has been emphasized throughout the division's existence and that the division has steadfastly fought for recognition of the principals laid down by it that railway supply work is a specialized function and should be performed by an independent organization, and that in virtually all discussions of the subject, purchasing and stores officers engaged in purchasing and stores work have dwelt upon this principal and considered the supply work from an organization standpoint.

The purchasing and stores departments of the railroads have grown and been strengthened under this policy and the importance of their work has received a much wider acceptance than it had 20 years or more ago. The specialized attention which the supply work has received under this plan has also resulted in economies in purchasing and distribution of material, even on those roads where separate departments were not so well co-ordinated. The development of the supply work and the supply departments during this period has been striking.

Changing conditions produce changes in viewpoint, however, and the situation has been observed in recent years where the departmental idea appears to have been modified somewhat in many quarters to allow for conditions, economic and otherwise, which are unfavorable to its continued growth. At least for the present, the necessity for separate and distinct supply personnel has been questioned, and the stress is more largely placed on methods and results. At the present time, interdepartmental co-ordination and inter-railway co-ordination are receiving most of the emphasis.

This transition is an interesting one for the Purchases and Stores Division. It now has before it as never before the job of enlisting the interest and co-operation of *all* supply officers, whatever may be their previous experience or their organization creed. Along with this is the unusual opportunity of meeting the needs of other railway departments for sound advice in the purchasing, handling and control of materials without prejudice. In place of an organization of railway purchasing and stores departments, the Purchases and Stores Division of the Maintenance and Operations Department should be the supply institute for the railroads.

The Complex and the Simple

Philosophers for ages have been pointing out that as civilization progresses, the human race is prone to become so involved in the complexities of life as to forget the simple things. In looking over the exhibits in the Auditorium, displaying as they do the epitome of mechanical genius and inventiveness, by contrast the mind is drawn to the simple, lowly cotter key and the facts that were brought out about it at the convention of the American Association of Railroad Superintendents in Chicago last week. There the R. F. & P. representative announced that a recent check of the application of several thousand cotter keys showed that not one per cent of them were applied correctly. The

proper method, it was stated, is to set the head firmly in the hole and bend both wings out to an angle of 45 deg. Several bars with holes drilled in them were exhibited at the convention, showing the lack of any standard practice in this connection. Improperly applied keys work loose and break under the strain, causing an occasional derailment, and thousands of expensive delays because of bad orders. The correct application of a cotter key is a simple thing, but it should not, for that reason, escape the attention of mechanical officers, as improper application is a fruitful source of trouble.

No More Slavery to Dirt

With the exhibition at Atlantic City during 1930 of the "Martha Washington," the air-conditioned Baltimore & Ohio diner, and the Santa Fe diner, which went into service during the same summer, the railroads were introduced to an innovation in the equipment of passenger cars for the comfort of railway patrons which has spread like wild fire since. About 650 air-conditioned cars were in service at the end of 1933, 2,500 a year later, 5,900 at the end of 1935, 8,400 at the end of 1936, and with the programs now about completed for the 1937 season, there are probably not less than 10,000 air-conditioned passenger cars now in service.

Air conditioning has changed the entire prospect with respect to summer travel. Not only was there the discomfort of high temperatures to contend with, but there was the dirt drawn in in liberal quantities through open windows or, indeed, around the closed windows under the action of the differential pressure produced by suction ventilation. Now there is a no more comfortable place than the interior of the modern passenger train on a hot day and whether the weather is hot or cold the interiors are clean. It is this by-product of the air cooling feature of air conditioning which has removed the limitations formerly imposed upon interior decoration by the necessity of concealing dirt. The artist may now have a free hand in his selection of colors and fabrics and even the possibilities for interior architectural treatment have been greatly improved by the elimination of any need for the clerestory type of roof.

Air conditioning and the entire new outlook with respect to aesthetic and comfort-producing factors in passenger-car interior treatment are the implements by which the new realization of the competitive character of transportation can be made effective by the railroads to protect their position in this field.

In spite of the remarkable growth in air-conditioning installations since 1930 the art of air conditioning is far from a perfect one so far as its application in railway equipment is concerned. There are still problems of comfort, particularly in dealing with odors and in temperature and humidity control. The latter will not have been mastered until a satisfactory form of automatic differential control has been developed. The former is a matter of proper filters or air washing, or both. The Engineering Report on Air Conditioning of Railroad Passenger Cars recently issued by the Division of Equipment Research of the A. A. R. is full of data which will play an important part in directing the efforts for the solution of these and other problems of air conditioning in effective channels.

The Programs for Today

Two divisions of the Association of American Railroads will hold meetings in the Auditorium at Atlantic City today. The Mechanical Division, which was in session for three days last week, will continue its meetings, and the Purchases and Stores Division will hold its first session.

Mechanical Division

The Mechanical Division will meet in Room B, at the right of the stage in the main exhibit hall of the Auditorium. The meeting will be called to order at 9:30 a.m., daylight saving time, and is scheduled to adjourn at 12:30 p.m. The program follows:

Address: Hon. Frank McManamy, Member, Interstate Commerce Commission.
Discussion of Report on Car Construction.

Purchases and Stores Division

The Purchases and Stores Division will hold the first session of its sixteenth annual meeting in Room A, at the left of the stage in the main exhibit hall of the Auditorium. The meeting will be called to order at 10:00 a.m., daylight saving time. The program follows:

Meeting called to order by Chairman.
Invocation.
Address by Col. C. D. Young, Vice-President, The Pennsylvania Railroad.
Remarks by J. M. Symes, Vice-President, Operations and Maintenance Department, Association of American Railroads.
Communications.
Appointment of Committees (Resolutions and Memorials).
Action of Minutes of 1936 Annual Meeting.
Report of General Committee.
Address by Chairman, E. A. Clifford, General Purchasing Agent, Chicago & North Western Railway.
Presentation and Discussion of Committee Reports:
- Subject 2—Standard Material Classification.
- Subject 3—Classification, Handling and Sale of Scrap.
- Subject 3A—General Reclamation.
- Annual Contest Committee—A. C. Mann, Chairman.

Individual Papers:
- "Constructive Thinking," by J. O. Brophy, Chief Clerk, Canadian National Railways.
- "The Supply Department and Public Relations," by Emmet J. Dennedy, Stock Clerk, Baltimore & Ohio Railroad.
- Subject 5—Forest Products.

Entertainment

10:30 A. M.—Organ Recital, Ball Room; William H. Jackson, Feature Pipe Organist.
9:00 P. M.—Grand Ball, Ball Room; Johnny Johnson (at the piano) and His Orchestra. Special Entertainment, Nevco Amusement Enterprises, Inc.

B. & O. Orders Two More Diesels

The Baltimore & Ohio has just ordered from the Electro-Motive Corporation two 3,600-hp. Diesel Electric locomotives which are to be similar in design to the one now on the track exhibit.

Chinese Locomotives Ordered

The Chinese Ministry of Railways has placed orders in the United States for 20 locomotives of the 2-8-2 type. Ten of these locomotives will be built by the Baldwin Locomotive Works and ten by the American Locomotive Company.

Going Home?

The Pennsylvania will operate two special trains for homegoing delegates on Wednesday, the 23rd. The Chicago special will leave Atlantic City at 4 p.m., eastern standard time, arriving in Chicago at 8:55 a.m., central standard time, and will be a solid Pullman train, with an observation car. The New York special will leave at 4:30 p.m., eastern standard time, arriving in New York at 7:20 p.m. This train will carry both Pullmans and coaches and will make only one stop—at Newark, N. J. Members desiring any other accommodations, by rail, by air, or by bus, will find a completely equipped ticket office on the lower level of the exhibition hall.

Committee on Locomotive Design and Performance

By Lawford H. Fry

Having been very much impressed by Mr. Winterrowd's paper Thursday morning and by the stimulating atmosphere in which it was presented and discussed, I should like to offer a suggestion to the General Committee of the Mechanical Division.

The author and the contributors to the discussion emphasized the fact that future progress in locomotive power development must be grounded on full study of the facts, past and present, and of their implications for the future. Compilation and correlation of existing information is of prime importance. Would it not be desirable to establish a Committee for Locomotive Design and Performance?

Every member of the Mechanical Division knows of the valuable contributions made by the Committee on Locomotive Construction. It treats the locomotive, so to speak, statically. Could not equally valuable work be done by a committee on performance, treating the locomotive in its dynamic aspect?

Welding Society Plans an Atlantic City Meeting

The American Welding Society convention committee, consisting of C. A. McCune, general chairman; Miss M. M. Kelly, secretary; Warner Hays, managing director of the society; William Spraregen, technical secretary; E. V. David, chairman, technical program; J. B. Tinnon, chairman of exhibits; T. M. Jackson, chairman of arrangements; H. E. Hopkins, chairman of registration, held a luncheon meeting in the Belvedere Room at the Traymore Hotel, Friday, June 18, to complete arrangements for their annual meeting and exhibit to be held at Atlantic City, October 18-23.

The headquarters of the Society will be at the Traymore, where all technical sessions will be held. The exhibit, embodying all phases of welding, will be at the Auditorium in co-operation with the Metal Congress.

Railways and the Exhibit

Railroads that have not been well represented at the conventions by executive and operating, as well as mechanical, purchases and stores and electrical officers, have made a mistake that will cost them much more than they have saved, because the exhibit is replete with new equipment, devices and materials with which the officers of every railway should be familiar. It undoubtedly includes more new things developed by the manufacturers to meet new conditions than any previous exhibit ever held. The *Daily* has observed a number of higher officers here. Among them have been John J. Pelley, president, and M. J. Gormley, executive assistant of the Association of American Railroads; W. J. Jenks, president of the Norfolk & Western; G. M. Shriver, senior vice-president, and C. W. Galloway, operating vice-president of the Baltimore & Ohio; R. E. Woodruff, operating vice-president of the Erie; T. E. Bond, vice-president of the Elgin, Joliet & Eastern; A. N. Williams, president of the Chicago & Western Indiana and the Belt Railway of Chicago; W. G. Besler, chairman of the board, Central Railroad of New Jersey; Duncan J. Kerr, president, Lehigh Valley; C. A. Gill, vice-president, Reading; H. L. Worman, chief operating officer, St. Louis-San Francisco; Charles W. Brown, president, Western Maryland; A. E. Wright, president and general manager, Manufacturers Railway; H. P. Crowell, president, Atlantic & North Carolina; C. E. Smith, vice-president, New York, New Haven & Hartford; F. I. Snyder, vice-president and general manager, Bessemer & Lake Erie; S. P. Ruddiman, president, Detroit, Toledo & Ironton; R. M. Shepherd, president, Pittsburgh & Shawmut; Norman Call, president, Richmond, Fredericksburg & Potomac; John K. Thompson, vice-president, Erie; R. H. Smith, general manager, Norfolk & Western; L. H. Phetteplace, general manager, Clinchfield; E. W. Scheer, president, and E. D. Hilleary, vice-president, Reading and Central Railroad of New Jersey; H. J. Humphrey, vice-president and general manager, eastern lines, Canadian Pacific; W. H. Bunney, president and general manager, Montana, Wyoming & Southern.

Mr. Pelley said he realized that a large amount of research and development work had been done by manufacturers for railways during the depression, but that he was surprised at the manifold evidences of it in every part of the exhibit. Brought together, as they are, under one roof at large aggregate cost to the manufacturers, the assembly of new equipment, devices and materials affords an opportunity to the railways to have their officers study them at a smaller cost than could be afforded in any other possible way.

The railways were until recently widely criticized for not doing enough research and development work. As has often been replied, they are engaged in transportation, while research and development as respects equipment and materials are primarily functions of manufac-

turing. In this great exhibit is the proof that research and development work for railways is being done in every direction and on a huge scale, and every railway that has not been represented here by a large enough number of its officers of all ranks to learn in detail what is being shown will pay for it many times over in its service and operating expenses.

What the exhibit mainly needs is visits from more railway presidents and vice-presidents. If more of them saw what is to be seen here, they would be so enlightened and impressed that they would willingly incur the comparatively small expense of having much larger numbers of their officers visit future exhibits. The apparent opinion of some of them that because an exhibit is held in Atlantic City a visit here by their officers is a junket and a relic of the dark ages of railroading in the United States. The manufacturers incur a large expense in bringing their exhibits here and experts to show and explain them, and for the railroads to incur a relatively much smaller expense to afford their officers opportunity to study them is saving at the spigot and wasting at the bunghole with a vengeance.

Registration Association of American Railroads

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Goetemann, Edwin, Asst. Mech. Supt., Am. Rfg. Tran., Marlborough
Haar, S., Asst. Elec. Eng., Ind. Sub. Sys. N. Y.
Haber, M. C., Mech. Eng., U. P., Ritz-Carlton
Haines, D. C., Asst. Gen. Fore., Penna., Colton Manor
Harahan, W. J., Jr., Contracting Agt., C. & O., Ambassador
Hardy, W. G., Gen. Fore., C. R. R. of N. J., Lyric
Hartman, F. N., Draftsman, Penna.
Hassett, M. W., Asst. Supt. Equip., N. Y. C., Ambassador
Hatch, Clarence E., Asst. Test Eng., N. Y. N. H. & H., St. Clair
Hatch, P. H., Eng. Auto. Equip., N. Y. N. H. & H., Haddon Hall
Hatch, V. F., G. F., Penna.
Hayes, T. M., Ast. Psgr. Traf. Mgr., Wabash, Traymore
Hays, L. D., Asst. A. B. Eng., N. Y. C., Haddon Hall
Hederman, Walter R., Asst. Mech. Eng., B. & O., Dennis
Irving, J. P., Eng. Car Const., C. & O., Haddon Hall
Isaacson, F. A., Eng. Car Const., A. T. & S. F., Traymore
Jabelmann, O., A. G. S. M. P., U. P., Ritz-Carlton
Jackson, Walter S., Adv. Mgr., C. & O. and P. M., Haddon Hall
James, F. T., G. F., D. L. & W., Flanders
Jansen, E., Rtd. E. E., I. C., Runnymede
Jenks, W. I., Pres., N. & W., Dennis
Jensen, E. W., Ch. Loco. Insp., No. Pac., Traymore
Johnson, E. L., Eng. of Tests, N. Y. C., Ambassador
Johnson, Roy R., Supvr. Rates, Reading, Eastbourne
Johnson, T. W., E. E. & M. M., C. of G., Ambassador
Kass, P., Supt. Car Dept., C. R. I. & P., Chalfonte
Kelley, Edward P., Gen. R. H. Fore., B. & A., Haddon Hall
Kemp, D. M., Gen. Mech. Shop Fore., W. M., Colton Manor
Kendall, W. C., Chair. Car Serv. Div., A. A. R., Haddon Hall
Kerekes, John J., Dept. Fore., D. L. & W., Jefferson
Kerr, D. J., Pres., L. V., Shelburne
Kidd, C. M., Gen. Car & A. B. Insp., Virginian, Haddon Hall
Kiefer, P. W., Ch. Eng. M. P. & R. S., N. Y. C., Claridge
King, H. F., Spec. Eng., Erie
Kinney, M. A., Dist. M. M., C. & O., Traymore
Kleine, H. J., M. M., Penna., Dennis
Knight, G. W., Ch. Elect., Alton, Ritz-Carlton
Knight, W. G., Mech. Supt., Bangor & Aroostook, Shelburne
Knorr, Raymond, Shop Supt., Erie, Knickerbocker
Knowlton, C. H., Asst. Eng. M. P., N. Y. C., Marlborough
Lauer, W. F., M. M., I. C., Dennis
Laux, J. P., S. M. P., L. V., Traymore
Laux, J. P., S. M. P., L. V., Traymore
Lawhon, A. M., M. M., Southern, Shelburne
Lawson, A. B., Asst. Eng., C. & O., Glaslyn-Chatham
Leblong, P. W., Asst. Eng. Elec., N. Y. C., Ritz-Carlton
Levy, Beni., Insp., B. & O.
Lewis, I. C., R. F. of E., R. F. & P., Marlborough
Lewis, J. P., R. H. Fore., D. L. & W., Pennhurst
Lewis, R. H., Div. Car Fore., Erie, Knickerbocker
McAndrew, R. G., S. M. P., N. Y. O. & W.
McCartney, J. D., Asst. to Recr., C. of G., Ambassador
McDonald, A. D., Pres., So. Pac., Chelsea
McDonnell, M. E., Ch. Chemist, Penna., Chalfonte
McGahey, R. E., M. M., R. F. & P., Shelburne
McHale, John J., Asst. M. M., D. L. & W., Morton
McKeeney, John T., Ch. Cl. Eng. Poll. Stk., N. Y. C., Ambassador
McMenamin, Charles G., Loco. Insp., Penna.
McMillan, A. E., Spec. Insp., B. & O., Princess
McMullen, J., Supt. Car Dept., Erie, Ritz-Carlton
McMullen, J. L., Eng. Drafts Elec. Equip., N. Y. C.
McMunn, W. R., S. R. S., M. D. T. Co., Ritz-Carlton
McVicker, William, Gen. Car Fore., Penna., Crillon
Maddox, Paul, Supt. Car Dept., C. & O., Haddon Hall
Magee, E. P., Gen. Welder Fore., Central of N. J.
Mahr, J. K., Equip. Insp., U. P.
Malone, Daniel C., Supvr. A. B., M. D. T. Corp., Morton
Marshall, Joe, Spec. Rep., A. A. R., Claridge
Martin, C. C., Boiler Fore., B. & O.
Massy, G. H., M. M., C. R. R. of N. J., Senator
Maxfield, H. H., S. M. P., Penna.
Maxwell, Ray, Adv. Mgr., M. P., Haddon Hall
Meadows, C. C., M. C. B., E. J. R., Ambassador
Meincke, F., Trav. A. B. Inst., D. L. & W., Chalfonte

(*Continued on page 1040D11d*)

Conventionalities . . .

Dr. B. D. Saklatwalla, inventor of Cor-Ten steel, is at the convention as a guest of Fred Foote of the U. S. Steel.

●

Could there be any significance in the fact that the *Lewis* Bolt & Nut Company has the booth immediately adjacent to that of the Republic Steel Corporation?

●

Beware of arguing with G. O. Beale, chief purchasing officer, Chesapeake & Ohio, Nickle Plate and Pere Marquette, and L. F. Duvall, assistant general storekeeper, Atlantic Coast Line. Both of them studied law.

●

Charles (Super-Chief) Ripley of the Santa Fe is here in body, but his spirit it out in the Golden West, where the new train is making such excellent traffic, operating and mechanical records.

●

We have with us during the convention no less a person than the president of a brother society, the National Railway Appliances Association, in the person of E. D. Cowlin, of the Reliance Spring Washer Division of the Eaton Manufacturing Company.

●

A. G. Pack, now retired, but for many years chief of the Bureau of Locomotive Inspection at Washington, is spending a few days at the convention, renewing old friendships. Since retirement he has been living quietly at the Hotel Continental, Washington.

●

Nat Duval, of the Massachusetts Mohair Plush Company, in addition to turning the hair of the thousands of mohair goats that are sheared in the annual round-up in Texas, into a wide variety of finished products, has his artistic side as well. Among other things, he has developed a new process of color photography that is attracting much attention.

Finders Not Keepers

The enrollment booth requests the favor of prompt return of any badges that may be picked up, and several of them have been lost so far. The lost badge on which any former Boy Scouts may do their good deed for today is numbered 6,015.

John Lewis Here

A visitor at the *Railway Age* booth yesterday was John Lewis. We hasten to add, however, that this John Lewis is enginehouse foreman for the Delaware, Lackawanna & Western for the convention.

Record Traveler?

David F. Robinson claims a travel record for the months of March and May. In the former month, he made an average of 2,800 miles a week, and, in May, he went from Boston to San Francisco and from the Gulf to Canada, selling machine tools for Wm. Sellers & Company.

Peaceful Fighter

O. L. Browne, assistant to purchasing agent, Atlantic Coast Line, has committed himself in writing as being a peaceful guy, but, apart from being chairman of the troop committee of the boy scouts, he recently landed a 25-lb. bass, and, if that wasn't a fight, then we don't know our bass.

The Younger Generation

The younger generation of both railway and supply men are here in numbers, many of them officially, for their first conventions. Among them we note Robert A. Carr, recently elected vice-president, Dearborn Chemical Company. As a plain "youngster," not as a business man, Robert Carr flew from San Francisco to Chicago on one of the first Boeing mail planes carrying paying passengers. That was in 1928. Again, quite recently, when he was transferred from Buenos Aires, Argentine, to headquarters in Chicago, he flew from Buenos Aires to Miami on one of the newest Pan-American Clipper ships. He is the son of Walter S. Carr, president of the Locomotive Firebox Company. Robert F. Carr, president of Dearborn, is accompanied here by his son, Robert F., Jr., so the "Bobs" of the Carr family are here in force.

Sir Knights

We have at least two noblemen at the convention, in A. Konrad Johnson, president of the Superior Engineering Company, and William L. Batt, president of SKF, both of whom were knighted by the King of Sweden for distinguished services some years ago.

Young Willard

Among the interested visitors at the convention is the grandson of Daniel Willard, president of the Baltimore & Ohio. The young man is just out of Yale, where he made the wrestling team, and will enter the B. & O. shops—in overalls—immediately after leaving the convention.

Brother Act

The booths of the National Malleable & Steel Castings Company and of the Cleveland Tanning Company are close enough together so that the brothers Wilhelmy can squabble with one another in their usual friendly fashion any time they want to. George F. is with the National and Fred R. is general sales manager of the tanning company.

The Ties that Bind

There seems to be a close understanding between all passenger car window sash manufacturers, or else making sashes gives men the same color sense. Led by G. LaRue Masters of the National Lock Washer Company and Robert Love of the Hunter Sash Company, all the representatives of each company were observed the other day wearing bright yellow ties.

A Lifer

Jack Foyle, vice-president Gustin-Beacon Company, has the distinction of being one of the few life members in the Purchases & Stores Division. He received this honor within the last two years in recognition of his service on the executive committee of the old Railway Storekeepers Association while he was a traveling storekeeper on the Missouri-Kansas-Texas.

Rah! Rah! Notre Dame!

If anyone wants to win (or lose) some money this fall, it can easily be done by betting against Notre Dame's football team with R. H. Adams, purchasing agent, Union Pacific, Los Angeles, Cal. As a loyal alumnus of that institution, Bob can probably tell you the number of yards gained by each of the Four Horsemen in every game of their career.

It Really Happened!

It is probably a good thing that W. S. Morehead, general storekeeper, Illinois Central, has an escort at the convention for he has been known to be a trifle absent minded. He took a taxi home from his golf club one night and proceeded to put his own car to bed only to discover that it was still at the golf course where he had driven it earlier that day.

But that isn't the only confession which the convention has produced. Comes the incident when G. E. Perrot, stationery supervisor of the Seaboard Air Line, boarded a train at Charlestown, N. C., one night for a trip to Savannah, Ga., got up the next morning and prepared to disembark when the porter said, "Boss, where do you think you is? Savannah? We ain't done left Charlestown yet."

W. H. Meyst, Otis Steel Company, goes this one better with

the tale about the passenger who asked the conductor of a train if there would be any objection to his wife getting off to pick a few flowers while the train was moving along, and when told that no flowers were growing in that location, retorted, "Oh, that's all right, I've got a little seed with me."

Another passenger, whose name is withheld, saw his train pull out ahead of time and sued the railroad, only to be confronted with the statement of the general counsel of the railroad during the trial that the train complained of was not the train said passenger had intended to catch but the train of the day before that lacked only ten minutes of being 24 hours late.

The tale that makes even the purchasing agents smile, however, is the one told by Lawrence Wilcox, Westinghouse Air Brake Company, about the Jewish scrap dealer who made a lump sum bid for 1,000 cast iron freight reservoirs which was twice the scrap price on a weight basis, then cinched the deal by giving his certified check for four times the scrap price and then later violently protested that he had been cheated because the "damn things were hollow."

Enrollment Committee

Chairman Burrhus of the Enrollment Committee has drafted two new members. F. B. Platt of the T-Z Railway Equipment Company, Chicago, is the son of the late John Platt of Hunt-Spiller, well known and beloved by conventionites of several decades. The other member is C. M. Damberg of the A. M. Beyers Company, Pittsburgh, Pa.

B. L. E.

Among the guests at the convention is Paul M. Smith, one of the grand officers of the Brotherhood of Locomotive Engineers, who is charged with the responsibility of editing and managing the Locomotive Engineers' Journal. He has been very much impressed in visiting the exhibits, to find the number of men who have graduated from the engine, but who carry and are proud of their locomotive engineers' cards.

Looking for Tips

L. G. Coleman, until recently with the Ingersoll-Rand Company, has been made director of a committee appointed by the Eastern Railroad Presidents' Conference, to plan for the exhibit of the railroads at the New York World's Fair, which is to take place in 1939. He is studying the Atlantic City exhibits critically, with a view to securing ideas which may be utilized at the World's Fair.

Three—Not One

The attractively colored advertisement of the Westinghouse Electric & Manufacturing Company, which appeared in the first three convention dailies, contained an error which we have been asked to correct. Instead of referring only to the Union Pacific Railroad 17-car streamlined train, the advertisement should also have referred to the Southern Pacific Railroad and the Chicago & North Western Railroad, all of whom participate in this train.

Page Noah!

Among those who are swapping personal reminiscences about the big flood of 1937 are C. H. Murrin, general storekeeper, Louisville & Nashville; Robert E. Hamilton, supervisor reclamation, Chesapeake & Ohio; W. S. Morehead, general storekeeper, Illinois Central; and W. R. Culver, general storekeeper, Chesapeake & Ohio. All of these men got their feet wet when the Ohio went wild, and several of them found that rowboats are sometimes better than tractors for material handling.

Slide-Rule Expert

For the P. & S. Division's slide-rule expert, we nominate G. J. Hunter, traveling material supervisor, Atchison, Topeka & Santa Fe, who could manipulate that tricky device before some of the storekeepers at the convention were born. Perhaps that explains his fondness for the slide trombone, as music is his other hobby. Some time, if in search of an interesting story, get George to tell you of how he saw the ill-fated Morro Castle burn, off the Jersey Coast.

"Youngest Traveling Engineer"

The "youngest traveling engineer" will be here today. He is William Allison Coffin, son of C. W. Floyd Coffin, and was so nicknamed when he was born twenty-one years ago while his father was attending a Traveling Engineers' Association convention. He is named after "Bill" Allison, who retired from the railway supply business some years ago to farm and raise a family in the sunny South.

Proud of His Daughter

W. H. Winterrowd's daughter, Mary, recently graduated from Purdue University, her father's Alma Mater, and "Bill" is proudly boasting that the ambitious young lady already has a "job." Mr. Winterrowd has a doctor's degree from Purdue and, by his frequent visits there and his contacts with and talks to the students, has earned the gratitude both of students and faculty.

Week-End Society Notes

On Saturday, the United States Steel Corporation held open house in the Submarine Grill of the Hotel Traymore between five and seven p.m., and, on Sunday, the Westinghouse Air Brake Company did the same, at the same hours, but in the Stratosphere room of the Traymore. A large number of guests, including many railway and supply executives and their wives, attended both gatherings.

Builder of Programs

Arthur N. Dugan, vice-president of the National Bearing Metals Corporation, has his usual smile, possibly intensified a bit because of satisfaction over having closed, as chairman of the program committee of the New York Railroad Club, one of the most successful seasons that club has ever held. It is no easy task to keep on putting over bigger and better meetings, but this is exactly what has happened during the years that Arthur has so ably acted as chairman of this important committee.

Engine Model Fan

George A. Pettit, mechanical engineer of the Reliance Machine & Stamping Works, is a railway model fan. He has brought with him his latest and greatest creation, a 3-ft. model of the "DeWitt Clinton" and a train of three coaches of the period, made of brass and mahogany, and containing over a thousand 1/16-in. bolts and 1/32-in. rivets. It is a complete operating scale model even to brakes, springs, firedoors, etc., and took him a year to make.

Schoolboy

Harrison M. Rainie, purchasing agent, Boston & Maine, has probably been out of school for a shorter time than any purchasing agent attending the convention. While he started railroading as long ago as 1909, he attended the Harvard graduate school in the summer of 1931, and took a special transportation course. Mr. Rainie is evidently sold on the school across the river from his office, for his son of the same name, age 17, is now a freshman at Harvard.

Now It Can Be Told

Colonel Ragsdale of the Edward G. Budd Manufacturing Company is a modest and a retiring gentleman, but occasionally, under proper stimulus, he can be smoked out into the open. Such an occasion was the recent trip of the new stainless steel Super-Chief of the Santa Fe, which took a party of New York fashion editors out to Santa Fe, N. M. As one of the genial hosts, naturally the colonel had to look pleasant, and, on page 31 of the July issue of Mademoiselle (the magazine for smart young women) he is doing exactly that. Of course, the presence of the charming Kay Silver, who wrote the article, in the same photograph may have had something to do with it. Ritchie, the

famous photographer, who took many pictures on the Super-Chief trip, including a classic showing S. T. Bledsoe and Edward G. Budd dancing the Varsouviana with a pair of senoritas, will attend the convention, as a guest of the Budd company.

For the First Time

Fred A. Poor, president of Poor & Company, is attending his first conventions in Atlantic City, with a more than platonic interest in the equipment business, his company having recently acquired control of the Peerless Equipment Company. Subsidiaries of Poor & Company, especially the P. & M. Company, have long been represented in the exhibit held by the National Railway Appliances Association, in connection with the conventions of the American Railway Engineering Association in March in Chicago.

Much Traveled

Dr. William L. Batt of SKF, is keeping up his record for covering space. Last year, as president of the American Society of Mechanical Engineers, he kept almost continually on the go in visiting the Local Sections and Student Branches, as well as keeping up his widespread business activities. This year he has already made one trip to Europe, but managed to get back in time to attend the recent Spring Meeting of the American Society of Mechanical Engineers at Detroit, and to be on hand for our conventions.

Predicts Large Wheat Crop

A. L. Gusten, Sr., who has the record of having been the first to engage in the railway supply business in Kansas City, is accompanied here by A. L. Jr. Mr. Gusten reports the crops in the southwest, and especially in western Kansas and the Texas panhandle as excellent, and as affording an especially large wheat traffic for the railways serving that territory. They don't have a large wheat crop in that part of the country with any regularity, but when they do business out there hums for some time afterward.

Crawl-Stroker

The record for an early morning swim goes to H. C. Pickett, St. Louis manager of Johns-Manville. This coveted honor went to Mr. Pickett without question at exactly 7:14 yesterday morning, when our wantering reporter, but, alas, not our candid camera man, discovered him so far out that suspicions were entertained that he was on his way to Europe. Late advices indicate that Mr. Pickett was not strictly amateur, in that he was on his way back from Block Island at the time, but this department recognizes no such quibbling and the prize is Mr. Pickett's.

A Man of Achievement

A. L. Humphrey of the Westinghouse Air Brake Company, after spending a few days at the convention, left for his home in the mountains on Sunday night. Few men can equal his record in convention attendance; he has been coming to the meetings regularly for 42 years. He takes just pride in the fact that he was a member of two committees that have made notable contributions to railway development and progress. He was a member of the committee which recommended the adoption of the air brake, as well as of the committee which recommended the automatic coupler.

Million Dollar Pier Versus Auditorium

Those who have attended the railway conventions in Atlantic City for years seem almost unanimous in thinking that Young's Million Dollar Pier was a much better place for the conventions and exhibit than is the Auditorium and in wishing they were back there. If the city officials and business men of Atlantic City want the conventions and exhibit here in the future, it will be wise for them to recognize this sentiment and do something about it. It is not necessary to elaborate for most of those who attended the conventions on the Pier and have attended those in the convention hall in 1930 and 1937 why this sentiment exists. The Pier, from one end to the other, was better adapted in almost every way than is the convention hall for all the purposes and activities of those who are now using the convention hall. Political influence in Atlantic City may force conventions that come here to use the Auditorium—but it cannot force railway conventions to come to Atlantic City.

A Rhymester

We might make these conventionality columns even more interesting if we could get hold of A. K. Galloway, the new superintendent motive power of the Reading, and have a stenographer take down some of his rhymes. Those who know him are continually amazed at his ability on the spur of the moment to turn out four or six-line rhymes on any personality or interest that may attract his attention. His ability as a rhymester, however, is not interfering in the slightest with the way in which he is keeping up the pace on the Reading set for him by Charlie Gill.

An Unsolvable Problem?

Saturday arrivals included C. B. Smith, engineer of tests, Boston & Maine, who, among other accomplishments, presented a paper on "Hot Boxes" before the December meeting of the New England Railway Club, which was so informative and comprehensive that it is still being talked about. Mr. Smith is a man who believes in action, and in making a definite effort to overcome difficulties, even when they appear insurmountable. He says that if hot-box prevention methods are confined to "the best that can be done under present conditions" the problem will remain acute, and again be passed on to the next generation.

Joe Coffin Missed

One of the convention visitors for many years who is most missed this year is Joel S. Coffin, who died in Florida two years ago last spring. Mr. Coffin, with his large interest in several companies, was long one of the most important leaders in the railway equipment and supply industry, and had a personality which made him widely influential and popular not only in his own field, but in the entire business of the country. Perhaps his most remarkable gift was his almost unerring judgment of men, and there are numerous men at this convention who would gladly admit that they largely owe their success to the opportunity and backing that he gave them.

Veteran

When, on last Monday and Tuesday evenings, the rain was pouring down, Curtis B. Friday, of the Chicago district of the Carnegie-Illinois Steel Corporation, merely smiled a pleasant smile. He was thinking, no doubt, of the days back in 1906, when, with the show out on the pier, and a lot of it uncovered, except for tarpaulins, a rain storm presented a real problem. Curt can check in with a perfect attendance record at these conventions even longer back than that. He attended his first one in Saratoga in 1901. While on the subject of Curt, it might be mentioned that he is the greatest living authority on the subject of "Diamond Jim" Brady, even though other people have written books about him.

Signaling Economist

It must be an interesting experience for one who has spent many years abroad to attend the Atlantic City conventions, with the comprehensive exhibit showing progress which has been made on American railways. Stanley E. Gillespie, who was recently appointed director of the Bureau of Railway Signaling Economics, which is maintained jointly by the Union Switch & Signal Company and the General Railway Signal Company, is attending the convention with Mrs. Gillespie. The Gillespies have spent most of the time abroad since 1921. During the first four years of that period Mr. Gillespie represented the Union Switch & Signal Company in Japan. Returning to this country he was until 1926 resident manager at San Francisco, and was then transferred to Belgium, where he spent several years representing the interests of the Westinghouse Air Brake Company and the Union Switch & Signal Company. Mr. and Mrs. Gilles-

pie are looking forward now to getting settled in their new home at Scarsdale.

Long and Able Service

The presidents and elected officers of associations change from year to year, or at least periodically. The officer who is responsible for carrying on over the years, however, is the executive secretary. Both the Mechanical Division and the Purchases and Stores Division are fortunate in that their secretaries are men of long service, who have developed strong staffs to assist them in carrying on the ever enlarging work of these organizations. Vaughn R. Hawthorne, secretary of the Mechanical Division, has held that office since 1919, having served as acting secretary during the previous year. W. J. Farrell, secretary of the Purchases and Stores Division, has held that position for the past 17 years.

Promotions

W. A. Culver, general storekeeper, Chesapeake & Ohio, has never found it difficult to smile, but this time he has a special reason for his radiance. He and his teamworkers have been delivering the goods so well, even though it took rowboats to do it in the Ohio Valley last spring, that he has just been promoted to superintendent of stores of the Chesapeake & Ohio in Pere Marquette. In his place J. C. Quarles, who is also attending the convention, has been moved from Richmond to become general storekeeper of the Chesapeake & Ohio, and J. C. McCoughn succeeds J. C. Quarles. It is a coincidence that both Mr. Culver and Mr. Quarles began their railroad careers as call boys. Mr. Culver is especially proud of the store forces at Huntington and has trophies to prove it.

Replacement Troops

W. B. Hall, purchasing agent of the Denver & Rio Grande Western, proud papa of seven children, is undoubtedly the head man at the Purchases and Stores Convention, when it comes to families, but there are many others who have done their bit to furnish the replacement troops. L. B. Wood, general storekeeper of the Texas & New Orleans, has five children; L. C. Thomson, manager of stores, Canadian National, has four; G. E. Perrot, stationery supervisor, Seaboard Air Line, has six, including a pair of twin boys seven years old; J. U. King, general storekeeper, Atlantic Coast Line and chairman, the P. & S. Division; E. A. Clifford, general purchasing agent, Chicago & Northwestern, and L. L. Studer, district storekeeper, Missouri Pacific, each has four. J. T. Van Horn, stationer, Missouri Pacific, also has four children, ranging in age from 5 to 13, and all of them are musicians.

Still on the GO

H. H. Laughton, assistant to vice-president, operations, Southern, does not specify how many conventions he has attended, but he became a member of the Railway Storekeepers' Association 26 years ago, and was a member of the Railway Accounting Officers' Association for many years before then. No wonder that association made him an honorary member. Besides all that, his service record of 52 continuous years with the Southern will stack up well with that of any other member A half century and more of service, however, rests easily upon the "Colonel", who traveled well over 20,000 miles in the past year in the course of his duties. Distinction seems to be hereditary in the Laughton family, too, for his son Bill is assistant general manager of the Bethlehem Shipbuilding Corporation (its youngest executive) and the "Colonel's" daughter, Mrs. Grayson B. Carter, is the wife of a commander in the U. S. Navy.

Tramp, Tramp, Tramp—

The boys are marching along the boardwalk with military stride, and, among the P. & S. Division members who learned how to do it in the army or navy are the following: L. B. Wood, general storekeeper, Texas & New Orleans (Spanish-American War); L. F. Duvall, assistant general storekeeper, Atlantic Coast Line (naval ensign during the World War); Lester M. Jones, assistant passenger traffic manager, Chicago, Milwaukee, St. Paul & Pacific (five years in the Minnesota national guard); Charles B. Tobey, general storekeeper, Lehigh Valley (six years in the national guard). Clyde L. Wakeman, general storekeeper, Wabash, had 25 months in France with the 110th Engineers, starting as a private and ending as captain and personnel officer of the 35th Division.

Clyde Cocke, purchasing agent, Norfolk & Western, saw 18 months overseas as sergeant major in the Rainbow Division. J. K. McCann, inspector of stores, Chicago, Burlington & Quincy, was sergeant with an ammunition train of the Eighth Division. G. W. Alexander, general storekeeper, Central of Georgia, was captain of the 496th Engineers. Roy M. Gidel, purchasing agent, Pittsburgh & Shawmut, was in the ordinance department. Henry Hansen, assistant purchasing agent, Northern Pacific, was in the U. S. Navy, Spanish-American War, also the Minnesota National Guard; and G. O. Beale, chief purchasing and stores officer, Chesapeake & Ohio Nickle Plate, Pere Marquette and was regimental sergeant major in the 318th Infantry. There are others, including Col. C. D. Young, but, should any foreign enemy attempt to invade our shores via Atlantic City during the convention, with the above group on call, the situation should be well in hand.

Dead-Eye Dick

The Dailies, over the course of the years, have recorded a wide variety of records in a wide variety of sports, industries and pastimes, yet the record recorded below is positively and absolutely unique. Carl C. Gibbs, president of the National Malleable & Steel Castings Company, has shot four separate and distinct holes in one in his long and distinguished career as a golfer. Moreover, on the occasion of the last one, made at the Mayfield Country Club in Cleveland just a few weeks ago, Carl called his shot, remarking casually: "It's high time I made another hole in one," and then proceeded to go ahead and do just that. This story was so remarkable that we had the several witnesses examined and cross-examined by our special prosecutor, but he couldn't shake their story, so it may be accepted as gospel fact. In connection with golf, Jim Slater, vice-president of National, maintains that the difficulties of selling castings during the depression were as nothing compared with the difficulties of keeping his country club going during the same period. Whatever the difficulties, Jim certainly did a good job with the Acacia club.

Progress Marches On

With the arrival of Purchasing and Stores officers for their convention comes the news of many improvements in equipment and facilities for railway supply work. B. T. Adams, district storekeeper, Illinois Central, is extending concrete platforms and adding to his lift truck equipment at Paducah, Ky. The Chicago, Burlington & Quincy, according to J. P. Blum, assistant purchasing agent, has recently installed automatic carbon paper feeding typewriter equipment in Chicago for writing orders on the purchasing department and has also installed a machine for casting type for duplicating work in place of hand-setting. The Bangor & Aroostook, reports E. W. Peterson, general storekeeper, has constructed new store houses at Oakfield, Me., and Millinocket. L. A. Duvall, assistant general storekeeper, Atlantic Coast Line, is organizing to use stock books for taking and calculating annual inventories, following which only a summary of the amounts in each A.A.R. classification will be furnished to the accounting department. C. B. Tobey, general storekeeper, Lehigh Valley, has extended the use of lift truck and skids equipment for material handling and has developed a new concentration yard for maintenance of way materials. C. L. Wakeman, general storekeeper, Wabash, has introduced a set-up for minimum and maximum stock control for regulating supplies at large round houses and small terminals. The Chicago, Rock Island & Pacific, according to J. C. Kirk, assistant general storekeeper, has made additions to its railroad trucking and material handling equipment, and the Peoria and Pekin Union, reports James O'Dea, purchasing agent, is now constructing a new modern store house and repair yard facilities at East Peoria; while W. A. Culver, general storekeeper, Chesapeake & Ohio, has plans under way for the installation of a conveyor system at the journal packing reclamation plant in Huntington, W. Va.

Railway Buyers and Storekeepers Meet

E. A. Clifford, Chairman

ATLANTIC CITY'S auditorium becomes the center of an added railway attraction today with the opening of the annual convention of the Purchases and Stores Division, Association of American Railroads. With the exception of the meeting in Atlanta, Ga., in 1931, all meetings of the Division since 1930 have been held in Chicago, and only the officers and committee chairmen were invited to the meetings in 1932, 1933 and 1934.

New Problems

Since the last year's meeting in Chicago when the Division again resumed something of its former stride, new complications have arisen to beset the supply officers. Railway legislation in the form of pension plans, train limit bills, six-hour day laws, etc., place new restraints upon the money available for supplies. Manufacturers have been passing the increasing cost of production on to railroads in the form of higher material prices. It becomes increasingly difficult to obtain prompt deliveries of material, with the increase in industrial activity, and labor difficulties in all parts of the country constantly threaten the continuity of distribution. However, the railroads are again in the buying mood and are taking advantage of every increase in earnings to rehabilitate and improve their properties.

With heavy increases in consumption, the rate of stock turnover and the unit costs of doing the supply business are improved. Purchasing is back to 1930 levels, war prices are paid for railroad scrap, equipment is being furnished for operating stores, capacity loading of cars and the proper education of supply forces are again in demand. In short, the wheels are again rolling and the veterans of seven years of tough going in the railway supply service gather today under the wide-arched ceiling of the country's largest auditorium for a fresh start.

Chairman Clifford

The chairman of the Purchases and Stores Division, E. A. Clifford, is a true son of Ireland, having started his life span in August, 1878, in the little village of Kara Sivere, Ireland, situated on a famous old military road in that country. Gene, as his many friends in the railway and railway supply business know him, came to this country with his parents in 1881 and settled in Chicago. He is an alumnus of the Saint Ignatius Academy, Chicago, and dates his railway career from the year 1900 when he landed a job as a messenger boy in the purchasing department of the Atchison, Topeka & Santa Fe under M. J. Collins.

During federal control, he was a member of the purchasing committee of the central western region; and in 1922, he represented the western executives on the railroad fuel committee in Washington, D. C., during the coal strike. With the exception of these temporary assignments, he continued in purchasing work on the Santa Fe until 1926 when his big moment came in the invitation from the president of the Chicago & North Western to become general purchasing agent of that road in charge of purchases and stores. The position was later extended to include the Chicago, St. Paul, Minneapolis & Omaha. The combined expenditures of the two railroads for supplies last year totaled $20,000,000.

Mr. Clifford served on various committees of the Division before being elected to the General Committee, but he is best known in the association for the arrangements he and the late G. W. Bichlmeier, Union Pacific, made for special trains to conduct the purchases and stores officers to their unforgetable convention in San Francisco in 1929, and more recently for his work during the NRA days as chairman of the railroad committee on the lumber code, which resulted in preventing the

A. L. Sorensen,
Vice Chairman

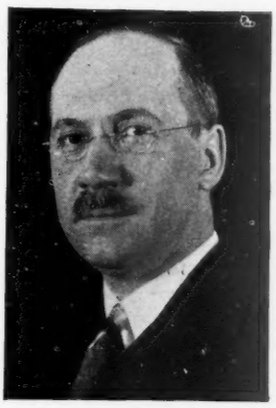
L. B. Wood

Whiting
L. P. Krampf

Russell
C. B. Tobey

E. J. Lamneck

J. C. Kirk



C. C. Warne

A. C. Mann

Moffett
G. E. Scott

W. J. Farrell,
Secretary

E. S. Jamieson

J. L. Bennett

O. A. Donagan

Moffett
E. D. Walker

C. H. Murrin

Members of General Committee, Purchases and Stores Division

lumber code authorities from dominating tie production and prices.

Since the last meeting of the Western Railway Club, he has added distinction of being second vice-president of that organization. He has four children; Eileen and Eugene have completed their studies, Mary is attending the University of Illinois and Jack Pershing is representing the family at Notre Dame.

Judging from the literature in the reception room of the North Western's purchasing department, the chairman believes in keeping the fine points of travel on the North Western before the railway supply industry. He uses a replica of a glass-insulator-equipped telegraph pole for a coat rack, has over two dozen autographed pictures of railway and railway supply friends on his office walls and handles his office work with dispatch. Indeed, there is a story that the chairman not only dictates his letters through the speaker system installed on his desk, but also that the switch is often open during his interviews with salesmen.

Allied Railway Supply Assn., Inc.

J. F. Gettrust, secretary of the Allied Railway Supply Association, Room 1108, New Post Office, Chicago, sends word that that organization is preparing for an exhibit to be held at the Hotel Sherman, September 28, 29 and 30, in connection with the joint meetings of such of the minor railway mechanical associations as may schedule programs in Chicago at that time.

Public Relations Committee, A.A.R.

The Advisory Committee on Public Relations of the Association of American Railroads met at the Hotel Traymore on June 17 and 18. The committee considered numerous subjects in connection with the public relations and advertising program of the association, but most of those participating in its meeting found opportunity to look over the exhibits in the Convention Hall.

Within recent years public relations work has begun to be accorded much more recognition of its importance and value by railway managements than was formerly the case. The titles of those included in the accompanying photographs are significant. Nine of them have the title of "assistant to the president" or its equivalent, showing that they report directly to their chief executives.

The members of this group and other public relations officers are carrying on activities for the Association of American Railroads, the eastern and western groups of lines and their individual companies, the results of which are intangible, but the improvement in public sentiment regarding the railways that has occurred demonstrates their activities are constantly becoming more constructive and effective.

Advisory Committee on Public Relations, Association of American Railroads, and Invited Guests

Top Row—Left to Right—H. P. Henshaw, Assistant to Vice President, Chesapeake & Ohio (Guest); Norris P. Ballou, Assistant to President, Railway Express Agency; T. J. Ross, Pennsylvania; W. S. Jackson, Advertising Manager, Chesapeake & Ohio (Guest); M. L. Lyles, Assistant to President, Atchison, Topeka & Santa Fe; Col. Robert S. Henry (above), Assistant to President, A. A. R., Washington; J. D. McCartney (below), Assistant to Receiver, Central of Georgia; H. F. McLaury, Manager, Advertising Section, A. A. R.; T. M. Hayes, Assistant Passenger Traffic Manager, Wabash; R. M. Van Sant, Director, Public Relations Department, Baltimore & Ohio; L. F. Whittemore (above), Assistant to President, Boston & Maine; I. L. Gordon (below), Publicity Manager, Reading (Guest); J. M. Fitzgerald, Vice Chairman, Committee on Public Relations of the Eastern Railroads, New York; Samuel O. Dunn; E. C. Schmidt, Assistant to President, Union Pacific; C. A. Radford, Publicity Manager, Cleveland, Cincinnati, Chicago & St. Louis (Guest); G. M. Crowson, Assistant to President, Illinois Central. Bottom Row—Left to Right—C. J. Corliss, Manager, Public Section, A. A. R.; W. E. Hall, Manager, Information Section, A. A. R.; R. J. Maxwell, Advertising Manager, Missouri Pacific Lines (Guest); B. E. Young, Manager, Railroad Section, A. A. R.; Holcombe Parkes, Associate Director of Public Relations, A. A. R.; H. M. Sims, Executive Assistant, Great Northern.

R. S. M. A. Holds Annual Meeting

D. L. Eubank elected president and Norman C. Naylor vice-president, by unanimous vote

PRESIDENT S. G. DOWN in addressing the annual meeting of the Railway Supply Manufacturers' Association stated that he felt that the present progress of the industry is likely to be a lasting one and that the improvement will continue, if certain clouds at present in the sky are cleared up. He praised the exhibits as being more varied and educational than ever before and stated that he felt that the industry is entitled to credit for the courage it displayed during the depression in continuing its research and development—the result of which are apparent on the exhibit floor.

He expressed the opinion that the association could anticipate the utmost co-operation from the Association of American Railroads under its new name and new organization. The attendance and interest, Mr. Down said, are good, and, when the convention is over, everyone should go home satisfied.

He announced further that there would be a meeting of the present officers and the officers elect, as well as old and new members of the executive committee, in Room A on Tuesday afternoon at 4 p. m.

D. L. Eubank and N. C. Naylor were unanimously elected president and vice-president respectively, to take office next September, and the result of the district elections was as follows:

District 1—E. J. Fuller, Hunt-Spiller Manufacturing Corporation, South Boston, Mass.

District 2—J. E. Brown, Magnus Metal Corporation, New York.

District 4—Cyrus Hankins, The Unitcast Company, Toledo, Ohio.

District 5—John H. Rodger, Oxweld Railroad Service Company, Chicago.

District 8—Webb G. Krauser, Canadian Cardwell Company, Ltd., Montreal, Que.

During the meeting F. N. Bard, president of the Barco Manufacturing Company, made an interesting suggestion concerning the advisability co-ordinating and unifying the various railway supply men's organizations which are associated with the different railway associations and divisions of the Association of American Railways. An article prepared by him will be found on another page of this issue.

Daniel L. Eubank, President-Elect

N. C. Naylor, Vice-President Elect

The New President

The pleasant, soft, drawl of the newly elected president indicates that the Southern sun has mellowed him, and this indication is eminently correct. Daniel Love Eubank is a Virginian by birth, and makes his headquarters in Atlanta, Georgia, at 625 Walton building during office hours and at 1130 Piedmont avenue during his hours of ease. He was born at historic Churchville, Virginia, on November 24, 1869, and is a widower with two married daughters, Mrs. Margaret McGlasson and Mrs. Inez Conyers. Educated, as have been so many presidents in these United States, in the country schools, Mr. Eubank began his career as a section laborer for the Chesapeake

& Ohio in 1888. Before he was old enough to vote, he had been promoted to locomotive fireman, and, at 23, he had already been moved over to the righthand side of the cab. After 11 years of driving a locomotive, Mr. Eubank was appointed road foreman of engines of the C. & O. and served in that capacity for the next eight years.

Thus, even in the post-war South, where opportunities were thought to be few and far between, Mr. Eubank had carved out a career for himself on the railroad. He entered the supply business in 1911, as service engineer for the Galena Oil Corporation, was promoted to district manager in 1919, and to supervising service engineer in 1922. In 1932, Mr. Eubank left the Galena Company, after 21 years' service, to form a railway supply company, of his own, and D. L. Eubank Company represents several of the leading railway supply manufacturers in the Southeastern territory.

Mr. Eubank is a Protestant and a Republican, and has held executive offices in many associations. He has been a member of the Traveling Engineers' Association since 1903, and has served as chairman of the committee on locomotive lubrication of that body. He was president of the Railway Equipment Manufacturing Association in 1922, and, in addition, he has served as treasurer of the Southern and Southwestern Railway Club for some years. His connection with the Railway Supply Manufacturers' Association is one of long standing, and, in 1916, his hard work for the association began, when he was appointed a member of the entertainment committee. From 1926 to 1930, Mr. Eubank was a member of the executive committee, being elected vice-president in the latter year.

The Vice-President Elect

Perhaps the best tribute to the ability of Norman Naylor, the vice-president elect, is the fact that he began working for one of the companies now a part of the American Locomotive Company many years ago, and has survived a large number of mergers since then. Since mergers are usually considered opportunities for eliminating the deadwood, the fact that Mr. Naylor survived so many of them is indicative of his value.

Norman C. Naylor, vice-president of the American Locomotive Company, in charge of the western district, with headquarters in Chicago, was born in Rochester, N. Y., on June 3, 1881. He entered the business world in 1895, as the office boy for McKee, Fuller & Co., in 1895, and served for a year before going out to Colorado for two years' schooling. When he returned, McKee, Fuller had merged with the Steel Tired Wheel Company, and Mr. Naylor entered the service of that company in 1898, serving until 1903, when the company was merged with the Railway Steel Spring Company, and serving that company, in turn, until 1926, when it was merged with the American Locomotive Company. Starting, as has been stated, as office boy, Mr. Naylor studied shorthand and became a stenographer, being advanced from that position to chief clerk. Someone detected the sales ability which he has since shown in full measure, and he was promoted to salesman, calling on the electric railways. In 1916, he was put in charge of the Chicago office of the Railway Steel Spring Company, and he was made district sales manager of the American Locomotive Company in 1926, being elected vice-president in 1932.

As a golfer, he is noted for his unerring approach shots, and for his executive ability, being a past president of the Westmoreland Country Club and serving at this moment as president of the Chicago District Golf Association. He has the enviable record of having been happily married for 32 years.

He began his work for the R.S.M.A. in 1910, as a member of the entertainment committee, and served on that committee until appointed to the executive committee in 1926, in which capacity he has been serving until his election as vice-president. He was chairman of the exhibit committee this year.

Registration Figures

The registration figures at 3 o'clock on Friday afternoon this year as compared with similar figures for the five previous conventions are shown in the following table. The railroad attendance compares quite favorably with previous years, when one takes into consideration the fact that the car department subjects, which always draw a larger attendance, are scheduled for this week rather than during the first week, as was the case in 1930 and 1926. The P. & S. Division also meets this week, although in previous years it met during the first week of the conventions.

	1922	1924	1926	1928	1930	1937
Mechanical, Division V.....	554	772	940	836	889	801
Purchases and Stores, Div. VI.	26	21	450	477	394	11
Motor Transport, Div. VIII...	....	....	....	41	64	....
Railroad guests	....	....	....	264	469	418
Railroad ladies	421	607	745	794	707	406
Supply men	2,015	2,300	2,615	2,419	2,176	2,117
Supply ladies	432	546	600	646	488	377
Special guests	276	419	340	22	152	68
Complimentary	....	....	....	299	*	....
Total	3,724	4,665	5,690	5,798	5,339	4,198

* Complimentary registrations included in railroad guests.

No *Daily* was published on Saturday morning this year, as was the practice at former conventions. Friday's registration figures, given above, are for comparative purposes. The count on Sunday afternoon at 3 p.m. was as follows:

	1922	1924	1926	1928	1930	1937
Mechanical, Division V.....	637	956	1,129	1,089	1,177	1,100
Purchases and Stores, Div. VI.	49	176	450	485	525	85
Motor Transport, Div. VIII...	....	....	....	56	68	....
Railroad guests	....	....	....	501	695	625
Railroad ladies	526	867	1,000	1,077	1,003	712
Supply men	2,056	2,467	2,944	2,486	2,379	2,443
Supply ladies	501	648	690	690	565	508
Special guests	407	651	615	24	156	78
Complimentary	....	....	....	299	*	....
Total	4,176	5,765	6,828	6,707	6,568	5,551

* Complimentary registrations included in railroad guests.

In addition to the registered members and guests, 2,300 persons were admitted to the exhibit on Saturday by showing return railroad tickets or passes. On Sunday 2,334 persons were admitted on this basis up to 3 o'clock in the afternoon. Large crowds also visited the track exhibits.

Electrical Section

The Electrical Section, Engineering Division, A.A.R., held a general committee meeting in Atlantic City on Friday, including the chairmen and vice-chairmen of all sub-committees. Reports in progress were discussed and plans drawn for the general meeting in the fall, and a decision was reached to hold it in Chicago. The sub-committee meeting was followed by a meeting of the Committee of Direction, which took official action on the resignation of E. H. Fritch as secretary. Chairman H. F. Brown announced the appointment of S. Withington, electrical engineer, New York, New Haven & Hartford, as representative of the A.A.R. Committee for the Revision of the National Electric Safety Code.

Registration, Mechanical Division

(*Continued from page 1040D5*)

Meincke, F., Trav. A. B. Insp., D. L. & W., Chalfonte
Mendler, C. H., Supt. Shops, N. Y. C., Colton Manor
Mewshaw, T. E., Div. M. M., B. & O., Seaside
Meyer, W. J., G. F., Penna.
Miller, A. L., Shop Draftsman, B. & O., Kentucky
Moran, Thos. F., G. F., C. & P., Continental
Moses, E. P., Eng. Roll. Stk., N. Y. C., Ambassador
Nash, F. P., M. M., I. C., Ambassador
Needham, R. J., M. & E. Eng., C. N. R., Ambassador
Neesley, F. P., M. M., Mich. Cent., Chalfonte
Negley, S. R., Elec. Eng., Reading
Ogaard, H. W., Boiler Insp., D. & R. E. W.
Pack, A. G., Ch. Insp. Loco. (Ret.), I. C. C., Marlborough-Blenheim
Page, Albert M., Civil Eng., N. Y. C., Jefferson
Persons, E. C., M. M., A. B. C.
Peters, J. H., Fore., B. & O.
Pfahler, F. P., Serv. Agt., I. C. C., Madison
Phillipe, A. B., Supvr. Tools & Mchy., C. S. & W., Colton Manor
Phillips, A. W., M. C. B., S. & A., Knickerbocker
Phillips, C. R., Car. Fore., Penna.
Phillips, Carl F., Ch. Draftsman, N. Y. C., Shelburne
Phillips, William E., Erect. Fore., D. L. & W., Colton Manor
Philpot, John, Shop & Mach. Insp., D. & H., New Richmond
Picker, K., Jr., Draftsman, B. & O., Kentucky
Plank, L. G., Gang Fore., Penna., Haddon Hall
Quinlan, F. T., Asst. Eng. Tests, N. Y. N. H. & H.
Radford, C. A., Pub. Mgr., C. C. C. & St. L., Traymore
Raetz, S. J., Supt. Car Main., Indep. Sub., Marlborough-Blenheim
Ramacciotti, F. P., Draftsman, N. Y. C.
Rankin, George W., Asst. M. M., L. & N., Claridge
Ream, A. H., S. M. P. & E., P. & S., Shelburne
Rees, Harry, Dist. M. M., B. & O., Ambassador
Reid, D., G. S. M. P., B. & M.-M. C., Claridge
Retterer, R. W., Mech. Eng., C. C. C. & St. L., Colton Manor
Rhodes, C., Supt. Car Rep., Erie, Knickerbocker
Rhodes, Robt. S., Asst. Eng., N. Y. C., Dennis
Richardson, E. F., Asst. Eng. M. P., B. & L. E., Haddon Hall
Sandhas, H. L., Gen. A. B. Insp., C. R. R. of N. J., Haddon Hall
Saunders, D. W., M. M., I. C., Haddon Hall
Schaeffer, Russell E., Sec. to Asst. Ch. M. P. & E., B. & O., Colton Manor
Scheifele, Leon H., Tool & Mat. Insp., Reading, Princeton
Schmid, Robert C., Trav. Insp. M. P. Dept., N. Y. C.
Schmidt, E. C., Asst. to Pres., U. P., Ambassador
Schmidt, V. P., Asst. Eng., Penna., Crillon
Schriver, Geo. M., Sen. Vice Pres., B. & O., Dennis
Schroeder, John H., D. L. & W., Arlington
Scully, Thomas P., M. M., C. W. P. S.
Seeley, Geo. E., Ch. Draftsman, D. L. & W., Traymore
Shank, L. R., A. B. Mech., Penna., Carolina Crest
Sheperd, R. M., Pres., P. & S., Shelburne
Shepherd, J. E., Gen. Loco. Fore., C. of N. J.
Sheridan, T. F., Asst. to Supts. M. P. & R. S., P. & L. E., Claridge
Sheridan, W. H., Ch. Cl. to V. P., L. V., Colton Manor
Sherrard, Henry M., Act. M. M., B. & O., Ambassador
Taylor, C. S., S. M. P., A. C. L., Haddon Hall
Taylor, G. H., Gen. Car Insp., C. & O., Ambassador
Taylor, S. O., M. C. B., Mo. Pac., Claridge
Teed, F. A., M. C. B., B. & O., Ambassador
Teel, Frank S., Mach. Shop Fore., L. & N. E., Seaside
Viele, S. M., Asst. Eng., Penna.
Von De Bogart, Jas., G. F., N. Y. C., Marlborough
Wakeley, G. B., Asst. Eng., N. Y. C.
Waldo, Clyde, Insp., I. C. C., Penn-Atlantic
Walker, A. R., Elect. Eng., I. C., Shelburne
Wall, Geo. W., Fore. Elec., D. L. & W.
Wallace, D. A., Supt. Car Rep., A. C. L., Haddon Hall
Walsh, E. N., Mech. Eng., E. J. & E., Claridge
Walther, A. G., Asst. Supvr. Shops, B. & O., Chalfonte
Wardwell, W. C., Asst. Eng. M. P. & R. S., N. Y. C., Ambassador
Waterman, E. H., Gen. Car Fore., Union, Morton
Webb, G. S., Gen. Electrician, Penna.
Weber, E. L., G. F., Southern
Weinberg, H. L., Asst. Eng. M. P. & R. S., N. Y. C., Chelsea
Young, B. E., Mgr. R. R. Sec. Pub. Rel. Dept., A. A. R., Haddon Hall
Young, C. O., Ch. Cl. to Supt. Car Dept., I. C., Claridge
Young, George F., Gen. Boiler Fore., Reading, Jackson
Young, J. B., Eng. Tests, Reading
Zerbach, W. H., Gen. Car Fore., A. C. L., Haddon Hall

Purchases and Stores Division

Beale, Guy O., Ch. P. & S. Off., C. & O., Dennis
Blum, I. P., Asst. P. A., C. B. & Q., Ambassador
Clem, Wesley A., P. A., Reading, Seaside
Corbett, J. W., P. A., C. N. R., Ritz-Carlton
Coyle, V. B., Recl. Plant Stkpr., B. & O., Seaview
Crusan, Clyde B., Dir. of Pur., Westmoreland, Crillon
Curtis, D. C., Ch. Pur. Off., C. M. St. P. & P., Traymore
Deery, James, Asst. P. A., Penna., Traymore
Driscoll, F. E., P. A., Erie, Ritz-Carlton
Evans, W. E., P. A., G. T. W., Ritz-Carlton
Farrell, W. I., Sec. P. & S. Div., A. A. R., Chalfonte
Griffith, B. W., Gen. Storekeeper, N. Y. C., Ambassador
Hanna, J. L., Gen. Mat. Supvr., Penna., Madison
Hayes, Howard, Gen. Stkpr., G. N., Haddon Hall
Hanson, E. E., Asst. G. P. A., Southern, Claridge
Hirsch, Wm., Req. Marker, Penna.
Hix, A. W., Asst. to Ch. P. & S. Off., C. & O., Ritz-Carlton
Hubbell, C. C., G. P. A., D. L. & W., Ambassador
Huber, L. E., Asst. to P. A., B. & O., Claridge
Hunter, Geo. I., Trav. Matl. Supvr., A. T. & S. F., New Belmont
Hyle, F. L., Matl. Insp., Mo. Pac., Llewellyn
I'Anson, R. A., Asst. P. A., Southern, Haddon Hall
James, J. H., P. A., P. & L. E., 1035 S. Dover
Kelly, J. T., Gen. Stkpr., C. M. St. P. & P., Ambassador
Kenzel, C. H., P. A., E. J. & E., Chelsea
Kirk, J. C., Asst. Gen. Storekeeper, C. R. I. & P., Traymore
Klausmeier, E. W., Matl. Insp., A. T. & S. F.
Lillengren, A. H., P. A., G. N., Traymore
McIlrane, C. L., Asst. P. A., Penna., Brighton
Miller, J. V., Asst. Gen. Storekeeper, C. M. St. P. & P., Shelburne
Morehead, W. S., Gen. Stkpr., I. C., Ambassador
Morris, W. H., Gen. Stkpr., Reading, Seaside
Munroe, Chas. F., Asst. P. A., N. Y. C., Ambassador
Murrin, C. H., Gen. Storekeeper, L. & N., Marlborough-Blenheim
Peterson, Martin, Ch. Clerk, L. V., Haddon Hall
Savage, T. E., Asst. P. A., Erie, Ambassador
Schultz, J. H., Asst. P. A., Penna., Ambassador
Sidey, W. J., Supvr. Scrap & Recl., L. V., Seaside
Sorensen, A. L., Mgr. Stores, Erie, Chalfonte
Sowash, F. E., Stkpr., P. & L. E., Haddon Hall
Spuhler, A. I., Dist. Stkpr., C. & N. W., Seaside
Sutherland, Lloyd, Gen. Stkpr., P. & L. E., Chelsea
Towner, M. E., Gen. P. A., W. M., Marlborough
Van Horn, J. T., Stationer, Mo. Pac., Madison
Warren, H. E., Mgr. P. & S., G. M. & N., Ambassador
Weedon, R. E., Supt. Rdg. Shops, Southern, Madison
Wheeler, W. L., Asst. Gen. Stkpr., C. & N. W., Seaside
White, C. S., G. P. A., N. Y. C., Claridge
Wood, L. B., Gen. Stkpr., T. & N. O., Haddon Hall
Young, W. H., Stockman, Penna., K. of C. Hotel

Special Guests

Anderson, A. L., Foreman, Penna.
Bachert, W. N., Gang For., L. I., Elberon
Bailey, Roth L., U. S. Civil Serv. Comm., Stanton
Bertan, Michael G., Pipe Fitter, C. R. R. of N. J.
Blazek, Joseph F., Draftsman, B. & O., Kentucky
Boehm, Frank E., R. F. E., Penna.
Brown, Donald, Sec. to Pres., Sou. Pac., Chelsea
Burdette, John C., Draftsman, B. & O.
Burkhardt, A. E., Sp. Appr., N. Y. C., Traymore
Cardegna, Frank A., Draftsman, B. & O., Kentucky
Carey, W. J., Investigator, D. L. & W., 19½ S. Rhode Island Ave.
Conn, George, Sec. Pub. Rel. Comm., A. A. R., Haddon Hall
Cordts, B. F., Eng. Cars & Shops, Independent Subway, Traymore
Cornell, Ralph, A. A. R., Ambassador
Coroen, Albert H., Draftsman, N. Y. C.
Coulston, Melvin H., Patent Counsel, A. A. R.
Cross, L. F., Fore., Union Tank Car Co., Haddon Hall
Cuzzoline, J. D., Gang Fore., Penna.
Darlow, A. M., Spec. Rep., B. & O., Madison
Develin, Richard G., Off. Eng., Penna.
Dietze, W. A., Gang Fore., Penna.
Doniecki, B. J., Jr., Draftsman, B. & O., K. of C. Club
Eckart, Ambrose, J., Draftsman, B. & O., Kentucky
Elben, Carl C., Supervisor, Penna.
Emmerich, Norman, Machinist, B. & O., Madison
Evans, Roy, Machinist, Penna.
Fletcher, H. L., Elect., S. A. L., Chelsea
Forner, Oscar, Engineer, C. R. R. of N. J.
Fowler, B., Sec., Pur. Dept., B. & O., Senator
Frakes, Chas. Ernest, Draftsman, N. Y. C.
Fraser, W. A., Asst. Eng. Diesel Mot. Pow., U. P.
Fry, W., Elect., S. A. L., Chelsea
Gans, Issaic, Dist. Labor Board, Washington, D. C., Claridge
Gibson, Albert W., Draftsman, B. & O., Kentucky
Ginther, Paul J., Sec. to Gen. Mgr., Reading
Gould, F. E., Equip. Insp., N. Y. C.
Hamilton, Charles, Dist. Pass. Agt., Wabash, Madison
Heffron, Thomas, R. H. Fore., D. L. & W., Byron
Henry, Robert S., Asst. to Pres., A. A. R., Traymore
Hilleary, E. D., V. P., Leading
Hillman, A. H., Off. of Eng. B. & B., Penna.
Hinkel, George C., Draftsman, B. & O., Kentucky
Horton, B. H., Erie, Haddon Hall
Humphrey, H. J., Vice Pres. & Gen. Mgr., C. P. R., Claridge
Hunt, Joseph L., Asst. Div. Eng., Track Div., Board of Trans., Dennis
Johnson, Geo., R. H. Fore., Erie
Kendig, H. D., G. F., Berwind-White Coal Mining Co.
Lambom, Samuel, Asst. Dist. Eng., Phila. City Transit, Traymore
Lawson, Harry W., Engineman, P.-R. S. L.
Lovett, Geo. A., Shop Supt., Union Tank Car Co., Haddon Hall
Lowe, C. I., Sec. to Ch. of M. P. & E., B. & O., Madison
Lund, Geo. O., Supt., Union Tank Car Co., Haddon Hall
Lundy, Clarence, Insp., N. Y. C.
Mause, W. E., Boiler Fore., B. & O., Flanders
McGuire, A. E., Ch. Clerk, I. R. T., Ritz-Carlton
McKay, C. J., Erect. Shop Fore., B. & O., Flanders
McMenamin, Chas. G., Loco. Insp., Penna.
Morningstar, Edw. E., Draftsman, B. & O., Louvan
Muhlenberg, A. B., Electrician, Penna.
Mushake, William I., U. S. Govt. Pat. Off.
Nagel, E. J., Ch. Clerk, Wabash
Parrish, D. T., Draftsman, N. & W.
Peters, J. C., Supt., Reading
Phillips, A. G., Supvr. Tool & Mach., D. L. & W., Colton Manor
Pollock, Harry T., Draftsman, B. & O., Kentucky
Porter, J. T., Mach. Helper, Southern
Robbins, E. C., A. A. R. Clerk, A. B. & C., Ambassador
Robinson, W. W., Trav. Psgr. Agt., C. R. R. of N. J., Madison
Rowe, H. A., Mgr. Claim Dept., D. L. & W., Haddon Hall
Royer, H. B., V. P., S. & H.
Russell, W. A., Former V. P. Bald. Loco. Wks.
Sanderson, H. M., Sec. to Pres., C. R. R. of N. J., Marlborough
Schiffers, Albert, Jr., Union Tank Car Co., Traymore
Schiertzle, E. P., Asst. Dist. Supt., Pullman
Schram, I. H., Eng. M. of Way, Erie, Strand
Scott, George, Engineman, Penna., Cleveland
Severn, Harry A., Student, Penna., Shelburne
Shaffer, G. G., Gang Fore., Penna., Buena Vista
Stevens, C. H., Ch. Eng., Dept. of City Tran. (Phila.), Traymore
Stewart, C. T., Asst. Supt., Penna.
Thornley, R. F., Asst. Matl. Eng., U. S. Navy
Van Der Heyden, Thomas, Draftsman, Penna.
Walsh, C. E., Gen. Pur. Agt., Penna., Ambassador
Wilson, Wm. H., Draftsman, B. & O., Kentucky
Young, Herbert E., Jr., Clerk, Reading, Elberon
Young, Peter, Supt., A. T. & S. F., New Belmont

Track Exhibit of Cars Features 38 Units

Passenger exhibits include latest light-weight cars—Freight units show comparisons of old and new

Directory of Car Track Exhibits

On Track 8 in Station

Pullman Roomette Car
Pullman Light-Weight Car Body
U. P. "Challenger" Chair Car No. 5304
New Haven Light-Weight Streamline Coach 8299
Kansas City Southern Light-Weight Coach No. 230
Pullman Light-Weight Box Car No. 501
Santa Fe Refrigerator Despatch Car No. 1100
Reading Caboose No. 92879
Reading Automobile Car (with Loader) No. 18768
Reading Automobile Car No. 18741
Reading Gondola No. 30341
P. R. R. Gondola 348308
P. R. R. Cement Car No. 254566
P. R. R. Automobile Box Car No. 48300
P. R. R. Coach No. 3792
P. R. R. Coach No. 4362

On Team Tracks Behind Express Building

Track 10

Phila. & Western Aluminum Motor Truck for Interurban Car
B. & O. 70-Ton Aluminum Car No. 631000

Track 11

Lukenweld Passenger-Car Underframe Section (on Reading Flat Car No. 9569)
Merchants Despatch Refrigerator Car No. 22419

Track 12

Unitcast Hopper Car No. WRAX-100
New York Central Hopper Car No. 850141
Mt. Vernon Light-Weight Box Car No. 9000
Bethlehem All-Welded Underframe for 50-Ton Flat Car
Bethlehem All-Welded Underframe for Standard A.A.R. Box Car
Bethlehem All-Welded Caboose Underframe

Track 13

B. & L. E. 40-Ton Hopper Car No. 5500
B. & L. E. 70-Ton Hopper Car No. 76001
B. & L. E. 50-Ton Hopper Car No. 45063
B. & O. 50-Ton Hopper Car No. 633000
B. & O. 40-Ton Box Car No. 367100

Track 14

C. & O. Covered Hopper Car No. 424
C. & O. Light-Weight 50-Ton Hopper Car No. 107
Carbon & Carbide Aluminum Tank Car No. 625
C. & N. W. Chair Car No. 6410

On Spur Track South of Express Building

Rock Island Three-Car Train—"Rocket"

WHAT is believed to be the most comprehensive track exhibit of passenger and freight cars ever shown in connection with a Mechanical Division meeting is assembled at the Pennsylvania-Reading Seashore Lines station at Arkansas and Missouri avenues. The exhibit is conveniently set up at two locations—on one track in the station itself and on four tracks and a spur to the southwest of the station building. Frequent bus service has been provided from the Auditorium to the track exhibit.

If there is any doubt that substantial progress has been made in the design and construction of freight and passenger cars since the last exhibit was held here in 1930 that doubt should be removed after looking over the 33 cars comprising this exhibit. Two things stand out as the accomplishments of the car designers and builders—light weight and passenger comfort. The former has been made possible by the development of new materials and methods of construction while new materials and the influence of modern interior treatment has contributed to the latter.

Rock Island Light-Weight Train— The "Rocket"

The three-unit Rocket train—comprising the cars "Dream Lake," "Mesa Verde" and "Centennial"—which is to be found on the spur track—was just completed by the Edward G. Budd Manufacturing Company at its Philadelphia plant in time to be brought down for the convention. This three-body-unit train, which, when placed in service, will be hauled by a Diesel-electric locomotive, is one of six trains recently ordered by the Chicago, Rock Island & Pacific. The general construction of these units employs stainless steel and is fabricated by the Shotweld process. The first body unit comprises a 17-ft. baggage compartment, a 10-ft. kitchen and an 8-ft. pantry space, both of which extend the full width of the car. A dinette with four tables accommodating 16 passengers is immediately behind the pantry and at the rear of the unit are seats for 16 coach passengers. At the tables in the dinette section are double seats instead of chairs. This first body unit is semi-articulated.

The second body unit is arranged for the accommodation of 76 coach passengers, with luggage compartments on both sides of the car at both ends of the passenger space. Saloons are located on either side of the unit, at the rear. The second body unit is semi-articulated, the forward end being carried on the single truck between the first and second body units. The truck centers of the four-wheel trucks of the first and second body units are 63 ft. apart.

The third or rear body unit is a combination coach and observation-lounge car. At the forward end are men's and women's saloons, immediately followed by lockers on either side of the aisle. To the rear of these is a

25-ft. 3-in. compartment fitted with seats for the accommodation of 28 coach passengers. The rear end of this body unit is observation-lounge space, making up a compartment 43 ft. 7 in. long, at the forward end of which is a quarter-circle bar at one side. Individual chairs and love seats are placed in the observation compartment, providing accommodations for 24 passengers. The rear end of this car has five windows in the rounded car end and a table under the center window, which has a swing sash. The rear unit of this train is non-articulated.

The estimated weights of this three-car train, ready to run, are as follows:

On first truck	56,815 lb.
On second truck	62,457 lb.
On third truck	53,662 lb.
On fourth truck	51,387 lb.
On fifth truck	38,294 lb.
Total	262,615 lb.

The total estimated weight of the five trucks is 77,500 lb. and the estimated service load is 10,000 lb.

Pullman Roomette Car

The Pullman Roomette car is an entirely new design. The roomette, a term used for the individual unit spaces in the car, is a small completely enclosed private room within the space of a section, containing one bed. There are 18 of these roomettes in a car. In the daytime the bed folds into the wall at one end of the room and the passenger has a sofa seat with ample space for lounging or for undressing before the bed is lowered for the nighttime arrangement. The bed is moved up or down with very slight effort. A safety device eliminates any danger of the bed falling during the operation. The beds are 6 ft. 5 in. in length. The sliding door of the roomette can be locked at night, or left open with a curtain drawn across the opening, as desired. Many conveniences, such as individual regulation of ventilation, light and heat, complete toilet facilities, with washstand folding into the wall, closed locker, luggage rack and a box from which the porter can remove shoes without disturbing the occupant are included in the design. The car is completely air conditioned. The car-body structure is completely welded. Rubber draft gear, tight-lock couplers and counterbalanced diaphragms are used on this car, as well as noise-deadening materials between metallic parts in movable contact. Experimental type four-wheel trucks having a 9-ft. wheel base are used.

Pullman Light-Weight Passenger-Car Body

The passenger-car shell exhibited by the Pullman-Standard Car Manufacturing Company is built of high-tensile low alloy steel meeting railway mail service requirements. The light weight of the shell is 26,000 lb. and the weight of the car body per foot is 327.8 lb. The length is 79 ft. 4 in. This car-body shell was built to be used for a light-weight Pullman sleeper having eight sections, two bedrooms and two compartments. The light weight of the car body, complete, would be 73,000 lb., plus the weight of the bolsters and trucks—36,000 lb.—making a total of 109,000 lb. A passenger coach built from this shell would weigh 103,600 lb.

The underframe and superstructure on one side of the car are exposed for observation and to show construction. One side of the shell shows the method of applying the insulation and interior finish. The trucks under this car-body shell on exhibit were built for light-weight cars ordered by the Southern Pacific and loaned by that road for this exhibit. They are equipped with journal bearings having the Satco lubricating feature.

C. & N. W. Chair Car No. 6410

Chicago & North Western chair car, No. 6410, exhibited on track 14, is a rebuilt car, equipped with the Waukesha Motor Company's gas-engine-driven air-conditioning unit. The refrigerating unit consists of a Waukesha four-cylinder gas engine, a four-cylinder V-type refrigerant compressor and two air-cooled tubular condensers, all with the necessary accessories. The whole unit is assembled on a structural-steel chassis, mounted on rubber tire, and supported by steel tracks secured to the underframe of the car. The unit may be rolled out from under the car. The evaporator unit on this car is supplied by the Trane Company and the distribution system in this car has been designed and installed by the Acoustic Division of the Burgess Battery Company, Chicago. The feature of this distribution system is to introduce incoming air over a wide area, eliminating drafts. This is known as the Burgess Multi-Vent sys-

C. & O. Lightweight 50-Ton Hopper Car Constructed with Principal Parts Built of Light-weight Alloy Steels by the American Car and Foundry Company

tem. The air outlet consists of perforated plates having $^{3}/_{32}$-in. diameter openings. These perforated plates form the ceiling of the car. The openings represent 10 per cent of the area of the distribution panel.

Aluminum Chair Car No. 5304

Union Pacific car No. 5304 is one of the aluminum chair cars recently completed by the Pullman-Standard Car Manufacturing Company, for service in the "Challenger" train. The car is constructed of aluminum alloys and has an over-all length, over couplers, of 81 ft. 0 in., and a light weight of 110,500 lb.

Lightweight Streamline Coaches

Two lightweight streamline coaches of similar design are exhibited on Track 8. These are the New Haven coach No. 8299 and the Kansas City Southern coach No. 230. These cars were built by Pullman-Standard. The New Haven is one of 155 similar cars ordered by the New Haven, 100 of which are now in service. It weighs 107,500 lb. light. These coaches are air-conditioned and are equipped with double glazed, stationary dehydrated sash.

B. & L. E. Hoppers

Of interest from the standpoint of comparing the old with the new, are three Bessemer & Lake Erie hopper cars on Track 13. The B. & L. E. No. 5500 is a 40-ton car built by the Carnegie Steel Company and put into service on July 1, 1896. This car was retired from active service on February 11, 1928, after having made 222,033 miles, carrying iron ore, coal and limestone for almost 32 years. The other B. & L. E. cars are 50- and 70-ton hoppers, both built of Cor-Ten steel. The 70-ton car weighs 45,700 lb., light, as compared with a normal average weight, of 56,000 lb. for an ordinary steel car of similar capacity.

Pullman Box Car No. 501

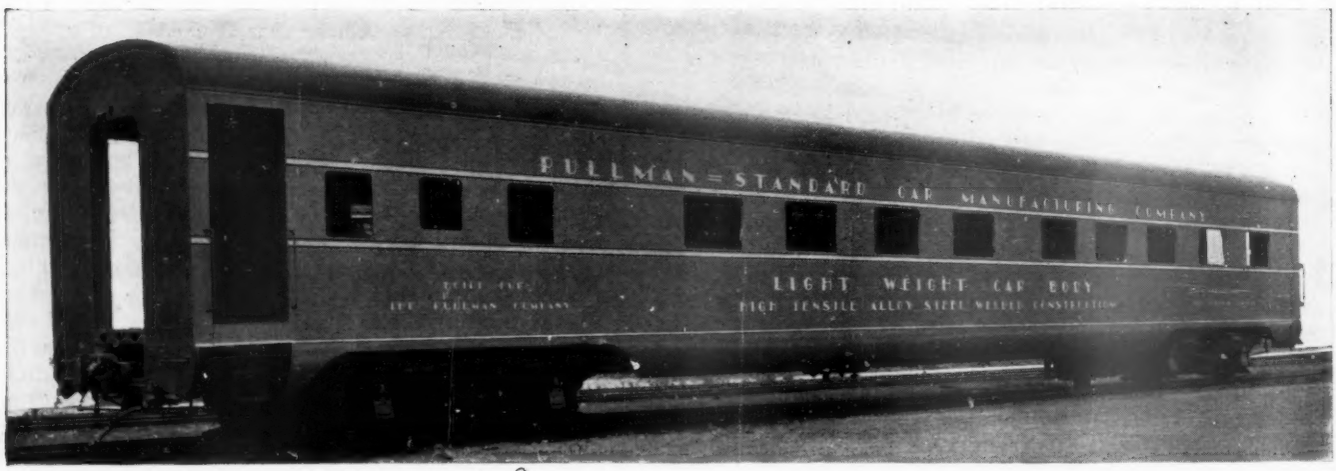
The Pullman 50-ton welded box car No. 501, has a lightweight of 35,300 lb., an inside length of 40 ft. 6 in., and an inside width of 9 ft. 2 in., between the side linings. This car is fabricated of alloy steel, the car sides being made of narrow vertical sheets 0.05 in. thick. This car was described in detail in the *Railway Age* of June 12, 1937.

B. & O. 50-Ton Box Car No. 367100

Baltimore & Ohio car No. 367100 is a 50-ton box car which was built in April, 1935, and was the first of the B. & O.'s covered-wagon type. The body is Cor-Ten steel and the underframe is constructed of Man-Ten steel which gives it large cubic capacity and a ratio of pay load to dead weight of three to one. The car is equipped with articulated lateral-motion trucks, anti-friction side bearings and AB brake.

C. & O. Hopper Cars

There are two Chesapeake & Ohio hopper cars exhibited on Track 14. One of these is a 50-ton lightweight hopper weighing 34,600 lb. This car was built by the American Car and Foundry Company. Among the features of this car are empty-and-load brakes; high-tensile cast-steel side frames and bolsters; light-weight alloy-steel brake beams; high-tensile cast-steel body bolster, center filler, striking castings, couplers and coupler yokes. Structural members are made of Man-Ten and Cor-Ten steel. The main side sheets and the corrugated ends and end side sheets are of $^{1}/_{8}$-in. Cor-Ten steel.



Lightweight Car-Body Shell Built by the Pullman-Standard Car Manufacturing Company

B. & O. Hopper Car No. 631000

Baltimore and Ohio hopper car No. 631000 is an all-aluminum car having a revenue load capacity of 140,200 lb. The body and underframe are aluminum alloy. The car is equipped with articulated lateral-motion trucks, anti-friction, self-centering side bearings and AB brakes. This car has been in service for three years, hauling soft coke between Grafton, W. Va., and Curtis Bay (Baltimore), Md., and has been dumped regularly by a car dumper. The car appears in the exhibit just as it was taken from service.

B. & O. Car No. 633000

The Baltimore & Ohio 50-ton hopper car No. 633000 is a light-weight car having a revenue load capacity of

8,110-Gallon Aluminum Tank Car Built for the Carbide and Carbon Chemicals Corporation by the American Car and Foundry Company

137,800 lb. The body and underframe are constructed of Cor-Ten steel. The car is equipped with articulated lateral-motion trucks, anti-friction self-centering side bearings, cushioned underframe and AB brake.

Reading Cars

A group of four cars is being shown by the Reading Company. These comprise a gondola, two automobile box cars, one with a special loading device for handling automobiles, and a Reading caboose.

Pennsylvania Railroad Cars

The Pennsylvania Railroad has as its exhibit a group of five cars—three freight and two passenger. The freight cars consist of a gondola, cement car and automobile box car. The two coaches are both air-conditioned, standard main line coaches, with different types of roof construction.

Aluminum High-Speed Motor Truck

The high-speed rapid transit motor truck being exhibited by the Aluminum Company of America has been in revenue service for approximately seven years, during which time it has run more than 150,000 miles. Part of the time it was used on the Philadelphia & Western Railway where speeds of 90 m.p.h. are frequently attained, and the remainder of the time it has been on the Indiana Railroad where speeds of 60 m.p.h. are made regularly. This truck, with motors, weighs 6,000 lb. and, without motors, weighs approximately 4,500 lb.

Welded Car Structures

A welded Cromansil steel end underframe section, such as used on high-speed Shotwelded stainless-steel passenger trains now under construction for the Santa Fe, is shown on Track 11. This was made for the Edward G. Budd Manufacturing Company by Lukenweld, Inc.

The box-car underframe on Track 12 is made with a welded bolster center brace and an A.A.R. standard center sill. The cross-bearer consists of a 12-in. I-beam and the cross-ties of rolled channels. The body bolster is built up with single-web plates and top and bottom tie plates. The bottom tie plate extends from the center sill to the side and is bent up at the end to support the side girders. The striking casting is welded to the center sill.

In the all-welded 50-ton flat-car underframe the cross-bearers are rolled I-beams, with the center sill supported directly on top of them. Another feature is the construction of the floor which is bolted to the side top members by means of a separate piece which can be punched and welded to the main top side member. The bolster center brace is welded, and the buffing members again consist

C. & O. 70-Ton Covered Hopper Car Built by the American Car and Foundry Company

of keys extending through and welded to the center sill, similar to the all-welded box-car underframe. These two underframes and the adjacent caboose underframe are part of the Bethlehem Steel Company's exhibit.

Other Cars in the Exhibit

Other cars included in the track exhibit are the lightweight Santa Fe Refrigerator Despatch car No. 1100, built by Pullman Standard Car Manufacturing Company, and the Merchants Despatch refrigerator car No. 22419, exhibited to show the Safety Car Heating & Lighting Company's gas-fired heater. In addition to these there is the Wine Railway Appliance Company hopper car WRAX100, with Unitcast parts, the New York Central hopper car No. 850141, with Armco Chromsteel body and door sheets and the Mt. Vernon lightweight box car No. 9000. This latter car was used in the A.A.R. tests.

Air Brake Men Conclude Meeting

THE concluding sessions of the Air Brake Association, held at Haddon Hall on Friday, were devoted largely to a discussion of recent important air brake improvements which will facilitate handling both passenger and freight trains faster, more smoothly and safely in line with the more exacting requirements of modern operating conditions.

In addition to the new H.S.C. high-speed passenger brake paper, presented by C. A. Campbell, New York Air Brake Company, at the Thursday session, papers on the following subjects were presented at the morning and afternoon sessions on Friday: "No. 8—E. T. Locomotive Brake Equipment," submitted by the Northwest Air Brake Club and read by Mark Purcell, general air brake inspector, Northern Pacific: "New Standard Type-AB Freight Car Brake," presented by C. D. Stewart, Westinghouse Air Brake Company; and "Type-AB Empty and Load Brake Equipment," presented by the Pittsburgh Air Brake Club and read by George Cotter, Westinghouse Air Brake Company.

At the conclusion of the technical session it was voted that the following officers be continued to serve the association during the coming year: President, W. H. Clegg, chief inspector air brakes and car heating equipment, Canadian National; first vice-president, R. M. Long, Pittsburgh & Lake Erie; second vice-president, W. F. Peck, supervisor air brakes, Baltimore & Ohio; third vice-president, C. H. Rawlings, general air brake inspector, Denver & Rio Grande Western. At the special request of Secretary T. L. Burton, New York Central, his resignation was accepted and R. P. Ives, mechanical expert, Westinghouse Air Brake Company, was elected secretary-treasurer. W. H. Davies, superintendent of air brakes, Wabash, was elected to the executive committee.

New Brake Equpiments Fully Described

In an orderly and comprehensive paper on the H.S.C. Passenger Brake, Mr. Campbell traced the development of the electro-pneumatic brake for high-speed control and indicated why each of the new features was necessary and how it operated. A series of charts and descriptive data was included in the paper, showing the development from the first plain straight-air system to the modern H.S.C. equipment. The reasons for the addition of certain automatic features, including the Decelakron and pilot valve were outlined, and the advantages of unit brake cylinders described. The latter part of the paper was devoted to a discussion of the necessity of electro-pneumatic sanding in order to permit taking advantage of the high braking ratio required in ultra high speed service without danger of wheel sliding.

In discussing the No. 8 E.T. locomotive brake equipment, comparisons were made with the No. 6 E.T. equipment now generally used and the numerous advantages from an operating and maintenance standpoint pointed out. These include primarily smoother handling with long trains and the control of slack. In a discussion subsequent to the reading of the paper several members of the association explained that locomotives equipped with this type of brake have been in service for upwards of three years with highly satisfactory results and that future new locomotives on their respective lines will carry it as standard equipment.

Special Features of the Type-AB Brake

The detailed paper on the development design and manufacture of the Type-AB Brake presented a review of the braking art from its beginning and associated each succeeding improvement with greater safety and economy in train operation. It gave an interesting picture of various phases of the production of new equipment, 150,000 sets of which are already in successful service.

In closing the paper on the empty-and-load freight-car brake equipment, the following comments were made, "There is now available Type-AB empty-and-load equipment for any class of load-carrying car now in general use, and the relative simplicity of this new equipment, along with interchangeability of the principal valve portions with standard single-capacity brake equipment, is such that the empty-and-load equipment should be given serious consideration for any load carrying cars built in the future where the gross-to-tare ratio exceeds 3 to 1 if the cars are of a type normally either empty or fully loaded. Higher speeds demand higher braking ratios for loaded trains if normal stopping distances are to be maintained with safety, and the most satisfactory manner of accomplishing this is by use of a brake equipment which will compensate in the necessary amount for the difference in stopping distance normally expected with empty-and-loaded trains, and thus provide the same degree of control in stopping loaded trains as is accomplished with the single-capacity brake on empty trains."

Additional Locomotive Track Exhibits

In addition to the locomotive track exhibits described on page 1004D15 of the June 16 Daily there is on exhibit on Track 11 a one-piece firebox wrapper sheet 294 in. long, 174 in. wide by 5/8 in. thick, rolled by the Lukens Steel Company for a Western Maryland locomotive. This plate was rolled on the large plate mill at the Luken's plant at Coatesville, Pa. This exhibit will be found on Reading flat car No. 9569.

On the same car will be seen a welded alloy-steel frame for a 600-hp., two-cycle Diesel engine used in switching locomotives. This frame was made for the Winton Engine Manufacturing Corporation by Lukenweld, Inc.

Third Session of Mechanical Division Convenes

Discussion of Locomotive Construction Report continued from second session, followed by scheduled reports

THE third session of the Mechanical Division was called to order by Chairman Burnett at 9:30 Friday morning. The discussion of the report on Locomotive Construction, not having been finished at Thursday's meeting, was continued before the presentation of the report on Electric Rolling Stock. This was to be followed by the reports on Specifications and Tests for Materials, Safety Appliances, Air Conditioning and Lighting Equipment, and the Joint Committee report on Utilization of Locomotives and Conservation of Fuel.

Discussion on Locomotive Construction

Lawford H. Fry (Edgewater Steel Company): Mr. Sheehan pointed out some of the anomalies and the difficulties with which we have to deal in the shelling of tires. In connection with his remarks, it seems to me that it might be of advantage if we could have, in conjunction with our committee and the Locomotive Construction Committee, the advice and contact with the locomotive builders themselves. There seem to be some problems of design there, and as tire manufacturers we are not in a position to study these details of design. I believe that that might be of assistance.

Chairman Burnett then accorded Felix Schwering, of the German State Railways, the privilege of the floor.

Felix Schwering (German State Railways): Nine years ago I attended your annual convention for the first time, and since that time I have been anxious to attend another convention of the Mechanical Division.

Our Director General, who had been in this country recently on the occasion of the World Power Conference in Washington and who was much impressed with the operation of the American railroads and the very friendly treatment accorded to him, agreed that I should again visit the United States.

I had been looking for some comeback of the railroads since the depression, but what I actually have seen surpassed all my expectations. I have not yet seen all the exhibits, but I can only congratulate the American railroad industry upon the progress it has made in spite of the hardships, the set-backs and the terrific blows of the long depression.

I think that it is a typical American institution, and a fine one that you people of the railroads can sit together, with guests from all over the world, and discuss your problems freely, without concealing anything.

We mechanical people are meeting all over the world on a common battlefield, which means we have to fight the limitations of space and time. Sometimes we also have to fight ill-will and, worst of all, stupidity. Behind the desk of your chairman I see only three flags. I would like to see there ten times, perhaps a hundred times, as many, until all the people of the world are sitting together and struggling together for the solution of common problems. That would be best for all the world, and I trust that the American people have some message for all the world which may help to this end.

Higher Boiler Pressures

D. S. Ellis (C. & O.): Based on my knowledge and experience with so-called higher boiler pressures (that is, about 200 lb. per sq. in.) from a practical standpoint, there appear to be as many opinions as there are differences in pressures; and from a theoretical standpoint, taking into account efficiency, expansion and temperatures, there appears to be a definite pressure beyond which the efficiency curve falls off and, not in the spirit of criticism but rather as a suggestion, I would recommend that the sub-committee handling this report include in their next progress report something definite on the subject, based on theoretical analysis.

W. E. Woodard (Lima Locomotive Works): In connection with the suggestion which Mr. Ellis has just made, I believe that such an analysis, while it would involve a rather extended and difficult study of the cylinder operations and steam performance, might lead to some very interesting conclusions.

In our experience in building locomotives and watching specifications and requirements of the railways, there is no question but what there is a very definite trend toward boiler pressures ranging from 250 lb. up to 300 lb. per sq. in.

Development and Use of Oil-Electric Locomotives

W. S. H. Hamilton (N. Y. C.): It is interesting to note the increase in horsepower of the Diesel locomotives used in switching service. It is presumed that a trend has also been shown toward the single-engine type of unit for this service rather than the double-engine type which was used to a certain extent when the oil-electric switching locomotives were first introduced.

In this connection it has been noted that Diesel locomotives with four-stroke cycle engines and supercharges driven by exhaust-gas turbines have recently been placed in service. It is to be hoped that the committee will report on these installations in subsequent years since the possibilities of securing a considerable increase in engine horsepower with very little increase in engine weight seem to be very good, judged by experience with marine engines using this type of supercharger. This development may play an important part in the development of locomotives of 900 hp. and more.

It would be very interesting if the committee could develop information that would show whether the cost of maintenance of the engines themselves increases appreciably with age. It has been claimed from some studies that this cost increases very materially with the age of the engine, whereas others have not found this to be the case, and that by proper overhauling at a given time, the maintenance costs can be brought back substantially to what they were when the engine was comparatively new.

While the difficulty of securing comparative maintenance costs between various railroads is recognized, it would be interesting if the committee could develop some figures that might indicate the distribution of costs on Diesel locomotives, particularly in connection with the engines themselves, as between the engines and the auxiliaries that have to be used with them. An investigation of this nature might indicate where considerable savings could be made in the maintenance of the locomotives.

J. W. Burnett (U. P.): I might say for the benefit of the committee in handling quite a number of Diesel engines we have found it absolutely necessary to take out the crank shafts around 200,000 miles, not that they cause any trouble but they wear out of round. The other parts of the engines so far have been maintained daily.

H. P. Allstrand (C. & N. W.): In connection with Mr. Hamilton's last suggestion, this subject was included in our study but we were requested to drop it by action of the General

Committee and at the request of the Heavy Traction Committee, which has a sub-committee working on that problem.

If it is the desire of the General Committee to place that item back in the hands of the sub-committee on the Development and Use of Electric Locomotives we would be very glad to pursue studies along that line.

Construction of Locomotive Boilers By the Fusion-Welding Process

G. S. Edmonds (D. & H.): The D. & H. welded boiler has not been applied to the chassis of the locomotive and it has been set out at the south end of our Colonie shop and will be fired up on Monday. We have connected it to the main steam line of the plant and will run it as a stationary boiler for six weeks. After that we will take it back in the shop, complete it, and it will go in service some time in August.

I went to Chattanooga to watch the stress relieving of this boiler, that being one phase which caused me considerable concern, thinking that there might be distortion. The boiler was placed in the furnace at about 6 p.m. and reached the stress-relieving temperature of 1,150 deg. F. which was maintained for 2½ hrs. Then the boiler was allowed to cool down. Previous to sending it down to Chattanooga, careful measurement tests were taken at the American Locomotive Company plant so that after stress-relieving such distortion as would be set up might be very carefully checked. It is interesting to know that there was no measurable distortion in any part of the boiler. I had felt, particularly with reference to the front tube sheet which was in the boiler at the time, that it might distort. As a matter of fact, such was not the case.

J. G. Blunt (American Locomotive Company): The development of Mr. Edmonds' boiler is interesting from the stability standpoint; extreme care was given to the welding, it was X-rayed throughout the entire length of the welded joint surfaces, and hammer tests were made under something like 325 or 330 lb. pressure; the results of these were very satisfactory.

J. M. Hall (Chief Inspector, Bureau of Locomotives, I.C.C.): I thought that I would go along with this experimental welded boiler. Personally I have no fear of the present-day welding when done under expert and close supervision and by expert welders, but I do want you to bear in mind that this boiler is experimental and it will be so designated for the next five years. This boiler, of course, is unusual. It has special boiler material. I understand seven or eight sheets were rejected. The welding was very closely supervised by the best welders of the American Locomotive Company. We are not very keen for welding on pressure vessels yet, unless the load is carried by other construction. This boiler in five years will tell us whether or not fusion welding is now safe for the construction of high-pressure locomotive boilers.

Mr. Edmonds has worked with us very closely and it will be interesting to watch the tests; we of course insisted on all known methods of tests being applied to this boiler, and we insist, of course, on the jacket and lining being removed as agreed upon within the next five years, so that we may detect instantly any imperfection if it develops.

Those specifications, of course, are the very best that have been developed up to date. We did not originate them. However, we did revamp and require a little stiffer test than is commonly required at this time.

Locomotive Guiding

Mr. Blunt: Careful consideration has been given improvements in roadbed and lateral resistance in the front axle of the trailing trucks. In this connection we should consider a much more flexible spring rigging; possibly that increased flexibility of spring rigging will bring up other improvements of harmonic vertical motion set up with the high speeds as the locomotive passes over irregular track, depression of rail ends, and so forth. We may have to go a lot further to control that movement so as to dampen out that harmonic motion.

In the design of locomotives we are all agreed that we should consider the locomotive as an entity, as a complete machine, not dealing with one particular point like lateral motion of a certain axle, or certain lateral resistance on a good track. We should consider also the interrelation of these points with all the others, so we may get a more balanced machine.

In the forward engine of the articulated locomotive, resting on a single bearing, at high speed we have the tendency for the development of harmonic motion and the tilting upon the center bearing. Running at the higher speeds over loose rail ends undoubtedly has been the cause of much of the serious vertical vibration which has caused more or less maintenance troubles.

As the locomotive passes over more or less rough-track there is a disturbance in the distribution of weight when there is a very inflexible spring suspension. As you know, most of our engines have been suspended at the front end of the forward spring, hooking that hanger solidly onto the frames. This is also true of the trailer truck. To obtain increased flexibility we have recently applied coil springs at the back hanger of the trailer truck, and even gone to the extent of equalizing the forward end of the spring by putting in a cross equalizer with hangers just on the inside of the frame with a tandem spring to get a flexible condition there, so that in running over irregularities of the track there will be more steady equalization of the load. All these tend to eliminate axle vibrations. That is, if you get instantaneous overloads as the wheel goes into a depression and out, these overloads undoubtedly contribute to more axle stress.

(On motion, the report was approved and referred to letter ballot.)

Report of Committee on Safety Appliances

Final report on automatic train-line connectors approved by the General Committee

Protection to Trainmen on Empty Well-Hole Cars

The question of providing a guard rail to well-hole cars for the protection of trainmen when such cars are operating without load was referred to the Committee on Car Construction for their consideration. The Car Construction Committee advised as follows:

"Rule 21 states: Bills may be rendered against car owners: (a)—for the cost of applying temporary hand railings to, or boarding over the opening on, emptly well-hole cars, except where the well has a solid bottom."

This situation has been taken care of for years as outlined above and the matter is adequately protected.

Automatic Train Line Connectors

The final report of the Joint Committee on Automatic Train Line Connectors has been approved by the General Committee.

Hand Brakes for Passenger Equipment Cars

The report of the Committee on Brakes and Brake Equipment and Safety Appliance Committee on hand brakes for passenger equipment cars has been referred to the Committee on Car Construction for their recommendation.

Standardizing Hand Brakes for Freight Cars

The Committee on Safety Appliances has been in close touch with the activities of the Brakes and Brake Equipment Committee in connection with the standardization of hand brakes for freight cars and recommendations for advancing their application.

The report is signed by R. G. Henley (chairman), superin-

tendent motive power, Norfolk & Western; F. W. Hankins (vice-chairman), assistant to vice-president-chief motive power, Pennsylvania; C. J. Bodemer, superintendent machinery, Louisville & Nashville; W. H. Flynn, general superintendent motive power and rolling stock, New York Central System; J. Purcell, assistant to vice-president, Atchison, Topeka & Santa Fe, and J. J. Tatum, general superintendent car department, Baltimore & Ohio.

(Upon a motion, the report was accepted.)

Report of Committee on Electric Rolling Stock

Most of the wire and cable used on electric locomotives and cars can apparently be made to last as long as the equipment

R. G. Henley
Chairman

The two subjects covered on the 1937 report are: (1) Probable life of low-voltage control-circuit wiring and of high-voltage cables on electric locomotives; and (2) Advantages in the use of anti-friction bearings in traction motors and main journals of multiple-unit cars and electric locomotives with respect to operation, maintenance, and conduction of current through parts.

Eight railroads and two manufacturing companies submitted to the committee their experience and recommendations covering the use of insulated wire and cables for electric cars and locomotives. These were the Virginian, Baltimore & Ohio; Delaware, Lackawanna & Western; New York, New Haven & Hartford; Pennsylvania; New York Central; Norfolk & Western; Chicago, Milwaukee, St. Paul & Pacific; Westinghouse Electric & Manufacturing Company, and the General Electric Company. These reports were summarized by the committee, as follows:

From a study of the experiences of the various railroads and manufacturing companies listed above, we find that control-circuit voltages range from 30 to 600 and power-circuit voltages from 600 to 11,000.

In the case of cables and wiring not subjected to flexing, mechanical abrasion, oil, moisture, and high temperature, it would appear that for voltages under 5,000 or 6,000 the life is practically indefinite. There are many cases where cables have been in service for 20 years and some cases where they are still in use after 29 years' service. For voltages above five or six thousand, rubber-insulated cables may be affected by corona action so that their life may be materially shortened on that account. In one case reported, cables operating at a potential of 11,000 volts lasted 20 years before requiring renewal due to corona action. Cambric-insulated cables were used in replacement and it is expected that their life will be practically indefinite.

In case of cables and wiring subjected to flexing, mechanical abrasion, oil, moisture, and high temperature, it would appear that the life of the cable varies according to the severity of the above conditions.

To secure maximum life of power cables and control wiring, the following suggestions are made:

1—Cables and wiring should be of ample size for the load proposed.

2—They should be located and installed to avoid flexing mechanical abrasion, oil, moisture, and high temperature.

3—Cables exposed to weathering should be painted with weather-proof paint at regular intervals.

4—Jumper cables should be designed each for its particular run and special attention should be given to terminal attachments.

5—Conduit runways should be well ventilated and where rusting of conduit occurs, renewals should be made with non-corrosive conduit.

6—Connectors should be chosen to give a good job mechanically and electrically. The jack-knife type is reported most satisfactory by one railroad, though no doubt there are other types that would give good service.

7—Terminals should be carefully installed so as to avoid overheating. Nicking of the copper when removing insulation should be partciularly avoided as such nicks may lead to failure. Cup terminals with wide shank for wrapping around the insulation and supporting the individual conductor are particularly recommended.

With the continued improvement in the manufacture of cable, wire, and miscellaneous fittings and with 20 to 30 years of operating experience to look back on, it may be expected that the life of power cable and control wiring will be considerably increased as time goes on.

Anti-Friction Bearings

Data concerning the advantages in the use of anti-friction bearings in traction motors and main journals of multiple-unit cars and electric locomotives, with respect to operation, maintenance and conduction of current through parts, was obtained by means of a questionnaire. Replies to the questionnaire sent to 13 railroads were received during the year 1936, eight of the replies containing information of value to the sub-committee. These roads are: Chicago North Shore & Milwaukee; Chicago South Shore and South Bend; Delaware, Lackawanna & Western; Great Northern; Illinois Central; Long Island; Pennsylvania; and Reading.

From the replies the committee selected comments which typify the experience of the railroads. These are, as follows:

Operation

1—Starting friction is somewhat diminished but exact data is not available.

2—It has been found necessary to keep brakes applied at stations on m. u. trains equipped with anti-friction journal bearings. This is not necessary with mixed equipment.

3—Running friction tests have indicated slight savings which become negligible after plain bearings become warm.

4—There has been no noticeable effect upon schedules.

5—Tests have shown a slight saving in energy on m. u. cars.

6—Anti-friction bearings are preferred by two roads using many of them because of their greater reliability and freedom from failures causing delays.

Maintenance

1—Trouble has been caused by propulsion current passing through bearings, in d. c. service.

2—Propulsion current has had some effect upon motor-axle bearings on one road. On another, which has many more roller bearing journals, the current is purposely carried through the motor-axle bearings and no trouble has occurred as a result. Both roads operate on d. c.

3—Heavy shunts between switches and motor frames, to carry propulsion current in d. c. service, have corrected the trouble on one road. Axle brushes are also being used and tests are being made of carbon brushes on wheels, on other roads.

4—Very little information is available one the maintenance costs of anti-friction bearings in locomotives and no conclusions can be drawn. One railroad has had high maintenance costs of armature bearings but these may have been caused by unusual conditions. The maintenance costs of anti-friction bearings on multiple-unit cars is much lower. Costs in the case of armatures is unknown and there is no information as to motor suspension and quills.

The report is signed by R. G. Henley (chairman), superintendent motive power, Norfolk & Western; A. L. Ralston (vice-chair-

man), general mechanical superintendent, New York, New Haven & Hartford; J. H. Davis, chief engineer electric traction, Baltimore & Ohio; J. W. Sasser, supertindent motive power, Virginian; R. Beeuwkes, electric engineer, Chicago, Milwaukee, St. Paul & Pacific; W. S. H. Hamilton, equipment electrical engineer, New York Central, and H. C. Griffith, electrical engineer, Pennsylvania.

(*On motion, the report was accepted.*)

Report on Specifications and Tests for Materials

Revisions include changes made in specifications to suit new conditions. New specification offered for commercial bar steel

F. M. Waring
Chairman

Your committee during the past year has reviewed a number of the specifications and considered comments and criticisms submitted by members of the Association, manufacturers and others, and submits the following revisions for your consideration.

Revised Specifications

Specifications M-104-34, Normalized and Tempered Steel Forgings

Par. 6 (f) No change in first sentence. The last sentence now reading "Rough machining, when so specified, shall be done prior to the final tempering treatment," to be changed to read

"When so specified, rough machining shall be performed prior to the final tempering operation, but if not so specified, rough machining may be performed prior to or after heat treatment, at the option of the manufacturer."

Specifications M-115-34, Steel, Boiler and Firebox, for Locomotives

In Par. 6, Tension Tests, under heading Firebox, Grade B, Elongation in 8 in. min. per cent, now reading $\frac{1,600,000,}{\text{Tens. Str.}}$ change to read $\frac{1,550,000}{Tens.\ Str.}$.

In Par. 13, Weight, the table has been slightly revised to make it agree with the manufacturers' standards.

Specifications M-116-34, Steel, Structural, Shapes, Plates and Bars

The specifications have been revised slightly to bring them into line with present manufacturers' practice.

Specifications M-117-34, Steel Sheets and Thin Plates

These specifications have been extensively revised as to form without any important change in substance.

Specifications M-202-31, Truck Bolsters, Design Test Requirements

These specifications have been revised to show actual test loading figures.

Specifications M-203-29, Truck Side Frames, Cast Steel, Design Test Requirements

These specifications have been revised to show actual test loading figures.

Specifications M-301-34, Iron and Steel Chain

Table I to be revised to reduce the required proof-test load for wrought-iron crane chain from the present figures which are 50 per cent of the breaking load, to 38 per cent of the breaking load. This has been done in order to avoid over-stressing the chain in proofing and to bring the specifications into line with what is present manufacturers' practice. No change has been made to other requirements for crane chain, and for proof coil chain which is made of steel.

Specifications M-302-34, Refined Wrought-Iron Bars

These specifications have been revised extensively as to form.

Specifications M-306-34, Welded Wrought Iron Pipe

In Par. 16 (a), the word "shall" in the last sentence should be corrected to read *"may."*

Specifications M-601-34, Hose, Air-Brake and Train Air-Signal

On recommendation of the Rubber Manufacturers Association Specification Committee, and in order to obtain a cover having greater resistance to the effects of ageing and light, it has been decided to raise the tensile strength and elongation for the cover. Par. 9, Tension Test of Tube and Cover, has been revised to read as follows:

"9. Tension Test of Tube and Cover.—The tensile strength of the tube shall not be less than 1,000 lb. per sq. in. and of the cover not less than *2,500 lb.* per sq. in. Gage marks originally 2 in. apart shall have stretched to at least *11 in.* before the specimen breaks."

Specifications M-603-34, Hose, Air, Gas and Oxygen, Wrapped and Braided

Par. 5 (c), next to the last sentence, include 5/16-in. size, making this read

"The number of plies for sizes 1/4-in., *5/16-in.* and 3/8-in. shall be optional with the manufacturer."

Par. 7, Protective Coating, second line, omit the words "or woven cotton jacket," and omit Par. 7 (b) entirely.

Par. 11, Permanent Set Test. To be omitted entirely as this test is no longer made.

Subsequent paragraphs to be renumbered.

Par. 16, Color. Change to read as follows:

"16. Color.—The color of the rubber cover of all hose shall be black, except *hose intended to convey flammable gas which shall be red, and hose intended to convey oxygen which shall be green."*

Par. 17, Label. Change to read as follows:

"17. Label.—Each length of hose shall have prescribed labels of a distinctly different color from that of the rubber cover inlaid therein and vulcanized thereto. When lengths of less than 50 ft. are specified, the labels *should* be located approximately in the center of the length of hose. *On mold-cured braided hose, lengths of 50 ft. or over shall have the labels spaced not more than 27 ft. apart. On mandrel-cured hose (braided and wrapped) lengths of 50 ft. shall have the labels located approximately 3 ft. from each end."* Remainder of paragraph no change.

In Fig. I, Label, omit the words "Wrapped or Braided."

The above changes have been made to conform to standard commercial practice.

Specifications M-604-34, Hose, Cold Water, Wrapped and Braided

Par. 10, Permanent Set Test. Omit entirely since this test is no longer made, and renumber all subsequent paragraphs.

Par. 15, Label. Change to read as follows:

"15. Label.—Each length of hose shall have prescribed labels

of a distinctly different color from that of the rubber cover inlaid therein and vulcanized thereto. When lengths of less than 50 ft. are specified, the labels shall be located approximately in the center of the length of hose. On mold-cured braided hose, lengths of 50 ft. or over shall have the labels spaced not more than 27 ft. apart. On mandrel-cured hose (braided and wrapped) lengths of 50 ft. shall have the labels located approximately 3 ft. from each end."

Remainder of paragraph no change.

Specifications M-605-34, Hose, Steam and Hot Water

Par. 11, Deflection Test. Omit entirely since this test is no longer made, and renumber all subsequent paragraphs.

Specifications M-606-34, Hose, Tender Tank

Par. 3, Classification. Omit entirely since Class "B" hose is seldom ordered.

Renumber all subsequent paragraphs.

Par. 8, Tensile Tests of Tube and Cover. Omit Class A and B at top of table, and omit entire third column of table.

Par. 9, Permanent Set Test. Omit entirely since this test is no longer made.

Renumber all subsequent paragraphs.

Par. 10, Friction Test. Omit Class A and B, and omit entire third column of table.

Par. 11, Bend Test. Change the first sentence to read *"A complete length of hose shall be bent, etc.—"*

Par. 12, Steaming Test. Change to read *"The digester steam test shall be used."*

In Fig. 1, Label, remove the word "Class."

Par. 18, Outside Diameter Over Soft Ends. Change figures for maximum and minimum in the table, increasing each figure in both columns by one-eighth, as follows:

Nominal inside diameter, in.	Maximum, in.	Minimum, in.
2¼	3¼	3⅛
2½	3½	3⅜
3	4	3⅞
3½	4½	4⅜
4	5	4⅞
4½	5½	5⅜

Par. 19, Marking. Change second sentence to read *It shall show the name of the railroad; kind and size of hose, etc.*— No change in remainder of paragraph.

New Specifications for Steel Bars

In response to request for a specification for steel bars suitable for bolts, bushings and general purposes, a new specification, M-122-37, has been prepared. These specifications cover commercial bar steels, hot-rolled and cold-finished, and cover both carbon- and alloy-steels of the grades in most general use.

New Specification M-122-37

1. *Scope.*—These specifications cover hot-rolled and cold-finished steel bars produced in accordance with good mill practice for bolts, bushings and general purposes. The sections covered are rounds, squares and hexagons of all sizes, and flats not over 6 in. wide.

2. *Basis of Purchase.*—The purchaser shall specify each grade by the grade designation or by its complete chemical limits.

I. Manufacture

3. *Process.*—The steel shall be made by either or both of the following processes: open-hearth or electric-furnace.

II. Chemical Properties and Tests

4. *Chemical Composition.*—The steel shall conform to the requirements as to chemical composition specified in Table I for the respective grades.

5. *Ladle Analyses.*—(a) An analysis of each melt shall be made for carbon, manganese, phosphorus and sulphur, and alloy, when alloy is specified.

(b) These analyses shall be made by the manufacturer from test ingots taken during the pouring of each melt. The chemical composition thus determined shall conform to the requirements specified and shall be reported to the purchaser or his representative.

6. *Check Analyses.*—(a) Analyses may be made by the purchaser from finished bars representing each melt. The average chemical composition thus determined shall not vary from the limits specified more than the amounts shown in Table II.

(b) Samples for analysis shall be taken by machining off the entire cross-section of the bar, or by drilling parallel to the axis of the bar at any point midway between the center and surface.

(c) The minimum number of samples to be taken from material representing the same melt, before rejection by the purchaser shall be three for 5 tons or less; four for over 5 tons to 10 tons; five for over 10 tons to 15 tons; six for over 15 tons.

(d) In case the number of pieces in a melt is less than the number of samples given, one sample from each piece shall be considered sufficient.

(e) Separate determinations shall be made on each sample and the results averaged, unless they clearly indicate mixed grades.

Permissible Variations in Dimensions

7. *Permissible Variations.*—The variation from the specified diameter, or distance between parallel faces, shall not exceed the limits specified in Tables III, IIIa, and IV.

Finish

8. *Finish.*—The material shall be free from injurious defects and shall have a workmanlike finish.

Inspection and Rejection

9. *Inspection.*—The inspector representing the purchaser shall have free entry at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the material ordered. The manufacturer shall afford the inspector, without charge, all reasonable facilities to satisfy him that the material is being furnished in accordance with these specifications. All tests (except check analyses) and inspection shall be made at the place of manufacture prior to shipment, unless otherwise specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

10. *Rejection.*—(a) Unless otherwise specified, any rejection based on tests made in accordance with Section 6 shall be reported within five working days from the receipt of samples.

(b) Material which shows injurious defects subsequent to its acceptance at the manufacturer's works will be rejected, and the manufacturer shall be notified.

11. *Rehearing.*—Samples tested in accordance with Section 6 which represent rejected material shall be preserved for two weeks from the date of the test report. In case of dissatisfaction with the results of the tests, the manufacturer may make claim for a rehearing within that time.

[These specifications included several tables, as follows:

Table I—Chemical composition and physical characteristics of S.A.E. steels, Nos. 1010, 1015, 1020, X1020, 1035, 1045, 1060, 1120, X1315, X1340, 2110, 2115, 2330, 3130 and 3140.

Table II—Variations from the limits specified in Table I permitted by check analysis—for carbon and alloy steels.

Table III—Permissible variations from specified size and shape of hot-rolled carbon and alloy steel bars.

Table IV—Permissible variations in the sizes of cold-finished steel bars.

Table V was included, as information only, to indicate the purposes for which the S.A.E. steels mentioned in Table I may be used.—Editor.]

It is requested that the members review this specification and advise the committee if they know of any other grades of steel that should be included in a specificaion of this kind.

Co-operation with Other Committees

This committee is also co-operating through sub-committees with the Committee on Locomotive Construction Sub-Committee on Tires, and with the Committee on Lubrication Sub-Committee on test for Reclaimed Oil and Journal-Box Packing.

Recommendations

Your committee recommends that the above revisions in speci-

fications and new specifications be approved for submission to letter ballot.

The report was signed by: F. M. Waring (chairman), test department, Pennsylvania; T. D. Sedwick (vice-chairman), engineer of tests, Chicago, Rock Island & Pacific; C. P. Van Gundy, engineer of tests, Baltimore & Ohio; F. Zeleny, engineer of tests, Chicago, Burlington & Quincy; H. G. Burnham, engineer of tests, Northern Pacific; E. E. Chapman, engineer of tests, Atchison, Topeka & Santa Fe; H. P. Hass, engineer of tests, New York, New Haven & Hartford; J. R. Jackson, engineer of tests, Missouri Pacific; H. G. Miller, engineer of tests, Chicago, Milwaukee, St. Paul & Pacific; J. W. Hergenham, assistant engineer of tests, New York Central, and C. B. Bryant, engineer of tests, Southern.

Discussion

E. E. Chapman (A. T. & S. F.): There are two specifications which have not been reported in this advance copy, one of which is as follows:

Spec. M-101-36, Marking, Par. 13a, to be clarified and read: Each axle shall have the manufacturer's name or brand legibly stamped on one of the black collars and the melt number, the month and year when made stamped on the other. All marking shall be hot stamped unless otherwise agreed upon with the purchaser.

The other change in the specification, which is not reported in this pre-print, is:

Spec. M-108-36, Boiler Tubes, paragraph 1a, Table II, second line of heading should be changed from the wording "Seamless only" to read "Seamless or electric resistance welded."

Table III heading should be changed from the wording "Permissible variation in Lap-Welded and seamless boiler tubes" to read "Permissible variation for dimensions and weight." This will make it apply to all the tubes in the specification and thereby will include the resistance-welded tubes.

A. G. Trumbull (C. & O.): It appears appropriate to make some observations upon the work of the committee, particularly in its relationship to that of other committees engaged in similar work. The Committee on Specifications for Materials is one of long standing in the Division, and it was created long before the American Society for Testing Materials or the American Society of Automotive Engineers. Thus its work was conducted on a more independent basis than is now possible or desirable. Manifestly, it is of importance alike to the manufacturer and to the consumer to provide for the use of materials, which, within reasonable limits, satisfy the requirements of standardized production. This has become all the more important by reason of the movement instituted several years ago by the United States Department of Commerce looking toward the adoption of standards with a view not only to economies in production, but for the purpose of facilitating deliveries and the maintenance of adequate stocks. These observations are made for two reasons:

(1) To emphasize the importance to the railroads of the adoption and use by the individual railroads of the Division's specifications.

(2) To point out to the Committee on Specifications for Materials that in drafting a specification, where available, it is extremely desirable that one of the existing specifications be followed, such as those of the American Society for Testing Materials, the American Society of Automotive Engineers, the Bureau of Standards of the United States Department of Commerce, and the American Standards Association. Because, through memberships held by its test departments, the Division is represented in the American Society for Testing Materials, it is suggested that, when available, the specifications of that society should be the chief origin for the Division's specifications.

There is still great opportunity for the standardization of materials in the railroad industry. This is indicated by the great variety of specifications still in effect by the various railroads, all of which impose a burden on the sources of supply, with a consequent increased cost to the industry. It is the plain duty of the individual railroads and even the Mechanical Division to adopt such measures as will assure the maximum results from the work of this committee.

A. G. Hoppe (C. M. St. P. & P.): I would like to call attention to a number of items for the consideration of the committee. In connection with the specifications of thin sheets and plates with the increased use of welding, it seems to me that there is a place for a thin sheet or plate that is devised particularly for welding. I am referring now to the matter of buckling in such sheets. If you will look in the proposed specification in the table of buckles you will find for sheets 60 in. or wider a buckle as high as 1 in. is permissible. We have enough trouble to keep the sheets flat without starting them out with a buckle which may be as high as 1 in.

This may necessitate a special specification of this commodity. While the proposed specification provides for stretcher leveling of sheets this does not appear to be the answer. As you probably know, when sheets are stretcher leveled a considerable portion of the sheet is strained beyond the elastic limit and subsequent welding may relieve strains that have been induced by this process and we still have buckling.

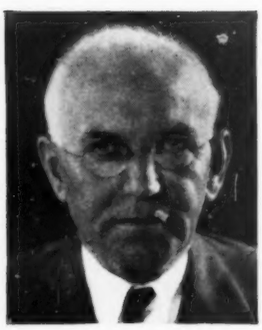
In somewhat the same connection is the increased use of flame-cutting for profiling complicated parts which run all the way from simple brackets and hangers up to entire locomotive side frames. Apparently there is a place or should be for specifications for material and for cutting heavy sections. I would like to recommend to the committee that they consider simple hot-rolled sheets particularly designed for welding operations with minimum buckling, possibly as little as ¼ in. Whether that is possible in the present state of the art I am in no position to say, but it does seem as though there is a necessity for such material.

Those of us who are occasionally charged with observing tests of side frames and bolsters will be very grateful to the committee for performing all the arithmetic necessary in arriving at the test loads.

Regarding the specification for bars, we have used such a specification for years and find that it covers most of our needs.

(Upon motion, the report was accepted and the recommendations referred to letter ballot.)

Utilization of Locomotives and Conservation of Fuel



J. T. Gillick, Chairman

No field surveys were made by the Sub-committee during 1934, 1935 and 1936. Quarterly reports were discontinued in 1931. No annual reports were prepared or submitted by the joint committee covering performance for the years 1934 and 1935. Data for these periods is incorporated in this report. Volume and unit data shown in this report indicate trends and factors, by years, for Class I carriers as a whole. Analyses have been divided between freight, passenger, and yard service.

Comparative data for each Class I carrier for the years 1934 with 1933, 1935 with 1934 and 1936 with 1935 were attached to the report.

Freight Service—Unit Performances

Table I shows the trend in unit performance for Class I carriers as a whole, by years.

Terminal to terminal train speed for 1934, 1935 and 1936 was 54.37 per cent, 55.34 per cent and 53.40 per cent, respectively, greater than the 10.3 miles per hour of 1920. Train speed for 1934 increased 1.27 per cent over 1933, showed a further increase for 1935 of 0.63 per cent over 1934 and decreased as a result of 1936 operation as compared with 1935 by 1.25 per cent.

Trailing gross tons per train increased from 1443 in 1920 to 1765 in 1934, to 1803 in 1935 and to 1859 in 1936 or by 22.31 per cent, 24.95 per cent and 28.83 per cent, respectively. Trailing gross tons per train increased 1.32 per cent during 1934 as compared with 1933, increased 2.15 per cent during 1935 as

compared with 1934 and increased 3.11 per cent during 1936 as compared with 1935. Compared with this the average tractive force per freight locomotive increased from 41,443 lb. in 1920 to 53,663 lb. in 1934, or 29.49 per cent; to 54,506 lb. in 1935, or 31.52 per cent; and to 55,048 lb. in 1936, or 32.83 per cent. The increase in tractive force for 1934 as compared with 1933 was 1.64 per cent; 1935 compared with 1934 was 1.63 percent; and 1936 compared with 1935 was 0.99 per cent.

Gross ton-miles per train hour showed progressive increases of 88.48 per cent for 1934, of 92.74 per cent for 1935 and of 96.18 per cent for 1936 over the average for 1920. The increase for 1934 compared with 1933 was 1.63 per cent, for 1935 compared with 1934 was 1.63 per cent and for 1936 compared with 1935 was 0.99 per cent.

Table I—Trends in Unit Performance

Year	Train speed	Gross tons per train	Gross ton-miles per train hour	Av. tractive force per loco.
1920	10.3	1,443	14,877	41,443
1921	11.5	1,435	16,555	42,065
1922	11.1	1,464	16,188	42,627
1923	10.9	1,539	16,764	44,675
1924	11.5	1,588	18,257	46,060
1925	11.8	1,670	19,685	46,930
1926	11.9	1,736	20,692	47,672
1927	12.3	1,780	21,940	48,634
1928	12.9	1,836	23,600	49,553
1929	13.2	1,865	24,539	50,066
1930	13.8	1,870	25,837	51,006
1931	14.8	1,810	26,721	51,671
1932	15.5	1,682	26,046	52,176
1933	15.7	1,742	27,344	52,771
1934	15.9	1,765	28,040	53,633
1935	16.0	1,803	28,674	54,506
1936	15.8	1,859	29,186	55,048

Table II—Miles per Day—Freight Locomotives

	Miles per active locomotive day							Hours per day	
Year	Principal	Helper	Principal and helper	Train switching	Principal helper and road switch	Light	Total	Road switch	Total
1920	75.4	5.8	81.2	5.8	87.0	4.1	91.1	.97	7.28
1921	69.7	4.7	7.44	5.7	80.1	3.8	83.9	.95	6.04
1922	70.5	4.9	75.4	6.1	81.5	3.9	85.4	1.02	6.37
1923	72.1	5.3	77.4	6.3	83.7	4.1	87.8	1.05	6.62
1924	70.6	4.8	75.4	6.4	81.8	3.8	85.6	1.07	6.15
1925	73.2	5.1	78.3	6.8	85.1	4.0	89.1	1.13	6.21
1926	75.4	5.4	80.8	7.2	88.0	4.3	92.3	1.20	6.32
1927	75.8	5.5	81.3	7.3	88.6	4.3	92.9	1.22	6.15
1928	77.8	5.8	83.6	7.7	91.3	4.3	95.6	1.28	6.05
1929	80.5	6.0	86.5	8.2	94.7	4.7	99.4	1.37	6.12
1930	79.7	5.4	85.1	8.4	93.5	4.5	98.0	1.40	5.77
1931	79.3	4.7	84.0	8.1	92.1	4.1	96.2	1.35	5.37
1932	78.3	4.1	82.4	7.8	90.2	3.8	94.0	1.30	5.06
1933	81.0	4.6	85.6	8.0	93.6	4.1	97.7	1.33	5.16
1934	84.8	5.0	89.8	8.5	98.3	4.5	102.8	1.42	5.34
1935	84.0	5.0	89.0	8.3	97.3	4.5	101.8	1.38	5.24
1936	86.9	5.8	92.7	7.5	100.2	4.9	105.1	1.25	5.49

Table III—Passenger Locomotive Performance

	Per active locomotive day					Pounds fuel per		
Year	Total miles	Train miles	Light loco. miles	Car miles	Cars per train	Car mile	Loco. mile	Train mile
1920	150.1	144.2	5.9	910.2	6.44	18.8	115.3	121.2
1921	142.2	136.2	6.0	865.6	6.35	17.7	108.0	112.8
1922	140.3	134.0	6.3	858.4	6.40	17.9	109.4	114.5
1923	142.4	135.6	6.8	882.3	6.50	18.1	111.9	117.4
1924	143.0	136.9	6.1	898.7	6.57	17.0	106.6	111.4
1925	147.7	141.2	6.5	950.1	6.73	16.1	103.5	108.3
1926	151.8	145.0	6.8	998.6	6.89	15.8	104.1	109.0
1927	154.0	147.2	6.8	1,029.4	6.99	15.4	102.8	107.5
1928	158.4	151.5	6.9	1,079.7	7.13	15.0	102.2	106.9
1929	164.5	156.7	7.8	1,145.5	7.31	14.9	102.1	107.2
1930	165.7	158.6	7.1	1,162.8	7.33	14.7	101.1	105.7
1931	164.5	157.8	6.7	1,167.3	7.40	14.5	100.8	105.1
1932	161.5	155.3	6.2	1,132.5	7.29	14.9	102.5	106.6
1933	160.9	153.6	7.3	1,129.4	7.35	15.2	103.3	108.2
1934	166.9	158.8	8.1	1,201.6	7.57	15.2	105.3	110.6
1935	171.1	162.2	8.9	1,233.0	7.60	15.5	107.5	113.4
1936	174.5	163.6	10.9	1,258.0	7.69	16.3	117.3	125.1

Freight Locomotive Mileage

Table II covers locomotive performance as to miles per active locomotive day for Class I carriers from 1920 to 1936, inclusive.

Passenger-Service Unit Performances

Passenger service data is not recorded the same as for freight service, in that train speed, tons per train and gross ton-miles per train hour are not shown.

Table III shows the unit performances for Class I Carriers by years since 1920, and percentage changes of 1934, 1935 and 1936 compared with 1920.

Yard Locomotive Performance

The total number of shifts worked by freight and passenger yard locomotives, and the miles, hours and shifts per active yard locomotive day were as shown in Table IV.

In freight service the unit fuel performances for Class I Carriers ranged as shown in Table V.

The pounds of fuel consumed per train hour increased 2.72 per cent in 1934 over 1933; 1.07 per cent in 1935 over 1934; and 0.93 per cent in 1936 over 1935, bringing the increases, over 1920, to 33.99 per cent for 1934; to 35.43 per cent for 1935; and to 36.69 per cent for 1936. The hourly work performed during this same period was 88.48 per cent greater during 1934; 92.74 per cent greater during 1935; and 96.18 per cent greater during 1936 over the hourly average for 1920.

In passenger service the fuel performance for Class I carriers is shown in Table III.

The report is signed by J. T. Gillick (chairman), vice-president, Chicago, Milwaukee, St. Paul & Pacific Railway; H. E. Newcomet, vice-president, Pennsylvania, and R. E. Woodruff, vice-president, Erie, representing the Operating Division, and by W. H. Flynn, general superintendent motive power and rolling stock, New York Central; J. W. Burnett, general superintendent motive power and machinery, Union Pacific, and O. A. Garber, chief mechanical officer, Missouri Pacific Lines, representing the Mechanical Division.

Table IV—Yard-Engine Performance

	Total shifts (1,000)			Per active yard locomotive day		
Year	Freight	Passenger	Total	Miles	Hours	Equiv. shifts
1920	6,901	480	7,381	*	*	*
1921	5,052	455	5,507	*	*	*
1922	5,458	462	5,920	*	*	*
1923	6,652	477	7,130	72.3	12.05	1.51
1924	6,092	489	6,581	64.0	10.67	1.33
1925	6,263	491	6,754	64.6	10.77	1.35
1926	6,573	504	7,076	66.3	11.05	1.38
1927	6,243	505	6,748	64.7	10.78	1.35
1928	6,098	499	6,597	65.7	10.95	1.37
1929	6,343	506	6,849	67.8	11.30	1.41
1930	5,437	488	5,926	63.7	10.61	1.33
1931	4,445	438	4,883	59.0	9.84	1.23
1932	3,475	383	3,858	53.6	8.94	1.12
1933	3,453	346	3,799	54.7	9.12	1.14
1934	3,676	348	4,024	57.8	9.64	1.21
1935	4,005	388	4,393	64.5	10.75	1.34
1936	4,718	401	5,119	71.5	11.92	1.49

* Not available.

Table V—Freight Service Fuel Performance

	Pounds per 1000 G.T.M.		Pounds per train hour	Pounds per		
Year	Inc. loco.	Excl. loco.		Active loco. day	Train mile	Loco. mile
1920	172	197	2,927	21,304	283.9	250.3
1921	162	185	3,060	18,484	265.2	236.4
1922	163	186	3,012	19,198	272.4	242.2
1923	161	183	3,065	20,299	281.4	248.8
1924	149	170	3,101	19,059	269.8	240.7
1925	140	159	3,128	19,422	265.4	235.8
1926	137	155	3,204	20,263	268.9	238.3
1927	131	148	3,247	19,959	263.4	233.4
1928	127	143	3,385	20,488	263.3	232.9
1929	125	142	3,476	21,273	264.2	233.4
1930	121	138	3,557	20,523	257.5	229.1
1931	119	137	3,648	19,600	247.1	222.4
1932	123	142	3,698	18,698	238.8	216.9
1933	121	140	3,818	19,704	243.3	219.5
1934	122	140	3,922	20,940	246.8	222.1
1935	120	138	3,964	20,758	247.2	204.1
1936	119	137	4,001	21,951	252.7	206.7

Discussion

A. A. Raymond (N. Y. C.): In studying the miles of the different engines per locomotive day we found quite a difference between the large roads and the smaller roads. In studying this matter on the larger roads, there seemed to be quite a difference

between the roads making the greatest total locomotive miles and those making the lesser total locomotive miles.

In passenger service we found that when running 400 miles per day the engine is working about half of the time, that is, about 12 hours per day. Now, with that in mind we found in 1936 the M. K. & T. making 250 miles per active locomotive day; the Santa Fe, 258; the Union Pacific, 256; and the Southern Pacific, 248. Based on 400 miles per locomotive day as one-half its working time, 260 miles, to use round figures, mean that the engine is working about one-third of the time.

In freight service our studies showed that 200 miles a day means that the locomotive is working 12 hours, or half the time. In analyzing the miles per locomotive day on various roads in 1936, we found the Texas & Pacific with 151; the Wabash with 150; the Chicago Great Western with 138; and the New York Central with 131. This shows that the freight locomotives are working roughly one-third of the time. The figure is 37 per cent on these roads that are getting the best performance.

It might occur to you that some roads are long and without feeders, while other long roads have feeders. Some roads of the former type have perhaps a better opportunity of making miles than the roads with many feeders. So in the study we made of passenger service, we took 16 roads that made the greatest amount of locomotive mileage. On that basis we find the Santa Fe best with 258; the Union Pacific with 256; the Southern Pacific 248; and the Missouri Pacific with 221. On any analysis basis we found the engine working only about one-third of the time.

It is interesting to note the improvement in obtaining use out of the engines. For instance, I mentioned the M. K. & T. making 250 miles in passenger service; going back to 1929 I find just one per cent improvement in that period. The Santa Fe shows 11 per cent improvement, the Union Pacific 1 per cent, the Southern Pacific 2 per cent, and the Texas Pacific 28 per cent.

In freight service we have a different picture comparing miles in 1936 with miles in 1929. The Texas & Pacific is leading the list with 151 miles—an improvement of 70 per cent. The Wabash with 150 had a 35 per cent improvement. The Chicago Great Western had a 13 per cent improvement, and the New York Central had a 30 per cent improvement.

In our study of yard engines, we found them working about 60 per cent of the time; compared to the performance of freight and passenger locomotives, this is quite a challenge to our ability in management.

Engines have been improved. The exhibit at this year's convention is filled with equipment which will help us keep our engines working, and to get more return from the investment in the machine. Therefore, we feel that we have not gone as far as we can with only one-third use of the machine.

We must run these trains reliably. We are running higher schedules and closer schedules than we ever used before, and we must have assurance that these trains will go through. Therefore, maintenance facilities must be improved, refueling stations must be adequately provided, and terminal facilities must be so located and maintained as to facilitate such schedules.

We have a standard of operation set up for us in the utilization of streamlined trains, which are taken out of service only in emergencies because we do not have any extra trains. If they come in and need attention they have to be repaired immediately. Dosn't that apply to our locomotives?

We think now that three days is sufficient for giving a locomotive a quarterly inspection. As a matter of fact, should an engine be tied up three days for a quarterly inspection?

Mention has been made of ash pits and coal docks. Inspection pits are just as important, because a locomotive should be inspected as soon as possible after the end of a run.

(*A motion was carried to accept the report.*)

Report on Air Conditioning and Equipment Lighting

Lower voltage lamps are considered for better car lighting — Battery guarantee offered for adoption

W. E. Dunham
Chairman

In view of the study of the design and performance of the several types of air conditioning systems in use on passenger-carrying cars as made by the Research Division of the Association, the committee is making no report on such matters.

The committee would, however, call the members' attention to the very clear and complete recommendations as to the inspection and maintenance of the various types of air-conditioning equipment as contained in the 1936 annual report of the Association of Railway Electrical Engineers.

Air-Conditioning Equipment in Service

Supplementing statements furnished in last year's report summarizing air-conditioning equipment in passenger-train cars in service as of December 31, 1935, by types of cars and by types of apparatus, the additional equipment as installed and put in service in 1936 is indicated in the summary table, together with totals, as of December 31, 1936.

Drives

The committee, in full cooperation with the A.R.E.E. committee having to do with the same subject, has been following the progress and development of the various types of drives, all of which have been reported to date. The service records so far are such that we are not in position at this time to make further detail report.

Incandescent Lamps

The insistent demand for better illumination in cars, and the necessity for obtaining a reasonable life of the present 32- and 64-volt car-lighting lamps, has suggested the development of 30- and 60-volt lamps as meeting in a better manner the average voltage conditions that maintain in service. The manufacturers of lamps are prepared to furnish such lamps, and the committee

Air-Conditioning Equipment in Service

TYPES OF CARS

Year	Coach	Chair	Combination	Parlor	Diner	Cafe	Lounge	Club	Business	Sleepers	Total
1933	115	18	25	69	205	6	109	6	3	92	648
1934	215	19	288	265	273	31	76	21	8	682	1,878
1935	790	217	356	46	244	57	39	16	11	1,574	3,350
1936	913	213	71	...	229	..	33	..	17	1,077	2,553
Total	2,033	467	740	380	951	94	257	43	39	3,425	8,429

TYPES OF APPARATUS

Year	Steam	Ice activated	Compression system: Motor drive	Compression system: Direct drive	Independent drive	Total
1933	41	297	218	92	..	648
1934	197	749	438	494	..	1,878
1935	549	993	1,725	82	1	3,350
1936	322	1,131	333	704	63	2,553
Total....	1,109	3,170	2,714	1,372	64	8,429

is following tests of them, anticipating having definite recommendations available for next year's report.

Voltage For General Power Supply

The committee has no further report to make on this subject in addition to what appeared in last year's report. It is closely studying and following the trend of conditions with a view of making a future report and possible recommendation.

Plug and Receptacle For Stand-By Power Connections

To clarify the recommendation made in the 1936 report, a notation will be added to the cut of receptacle, Page H-61 of the Manual, stating that this receptacle is to be mounted in a swivel support for charging receptacle as shown in Fig. 11, Page H-17 of the Manual.

Electrical Insulation

Recent flood conditions have emphasized the necessity that all electrical insulation be impervious to moisture.

Battery Guarantee

The report is concluded with a recommended guarantee and adjustment agreement applying to storage batteries for use on railway passenger cars. This guarantee was developed by the Association of Railway Electrical Engineers. Its purpose is to make available to the railway companies, in a uniform manner, such data as may be required concerning the guaranteed life, adjustments and replacements, operating characteristics and requirements, ampere-hour capacity at various loads, and other usual comparisons between the various makes, types and sizes of battery offered for this class of service. The committee recommends that the guarantee be submitted to letter ballot for adoption as recommended practice.

The report is signed by W. E. Dunham (chairman), superintendent car department, Chicago & North Western; E. Wanamaker, electrical engineer, Chicago, Rock Island & Pacific; A. E. Voigt, car lighting engineer, Atchison, Topeka & Santa Fe; F. O. Marshall, electrical engineer, Pullman Company; P. J. Callahan, supervisor car and locomotive electric lighting, Boston & Maine; O. M. Bixby, assistant engineer, New York Central; W. J. Madden, assistant foreman, Pennsylvania, and G. W. Bebout, electrical and shop engineer, Chesapeake & Ohio.

Discussion

C. C. Elmes (Division of Equipment Research, A.A.R.): Your Committee has stated that, in view of the study of the design and performance of the several types of air-conditioning systems in use in passenger carrying cars made by the Division of Equipment Research, no report is being made on such matters.

This research was concerned primarily with railroad-owned cars, although rather complete information was obtained concerning the performance of the air-conditioning equipment installed on 120 Pullman-owned and operated cars. The scope of the study is given in the accompanying table.

An assay sample of such magnitude accurately reflects the actual state of the whole.

Scope of Study

1. Number of air-conditioning systems tested in laboratory	15
2. Number of drive mechanisms tested in laboratory	6
3. Number of air-conditioned cars tested in hot room	14
4. Number of railroads that conducted road tests	31
5. Number of passenger cars on which road tests were conducted	594
6. Approximate number of hours of road testing	5,200
7. Approximate number of miles of road testing	240,000
8. Number of passengers who submitted comments on conditions in air-conditioned cars while tests were being made	5,453
9. Approximate number of data readings for all laboratory and room tests	250,000
10. Approximate number of calculations made from recorded data	85,000
11. The analysis of costs is based upon the experience record of 1,608 cars for 1931 with a total car mileage of	178,259,768

Reports on Air Conditioning

There have been three reports issued to the members of the Association concerning this study: The first report is a manual containing a discussion of the purposes, programs, procedures, and schedules relating to the air-conditioning research project. The second report is a summary of results dealing with those factors conceived to be of direct concern to the railroad executive. The subject of costs is discussed in detail. The third report is an engineering report designed to meet the needs of the air-conditioning engineer and railroad operating personnel. In it are presented the results of laboratory tests of air-conditioning systems, drives and cars and the results of road performance tests of cars.

The major findings and recommendations of the entire investigation are briefly stated in the engineering report. The Division has prepared these findings in a pamphlet for ready reference. It is available to those desiring it. (Mr. Elmes presented a copy of this pamphlet to be included in the record.—Editor.)

During the past year the Division has conducted tests of an Illinois Central passenger car equipped with a dry-ice air-conditioning system; also a complete laboratory study of the Waukesha Trane mechanical compression system with an internal-combustion-enigne drive. These reports are available to those desiring them. Studies are being made of the Burgess multivent air-delivery system as applied to railroad passenger cars.

One of the primary advantages of air-conditioning is greater cleanliness. The filter is therefore one of the very important parts of an air-conditioning system. Perhaps it is one of the most unsatisfactory parts. The Division, during this summer, is making a thorough study of filters.

Further Studies Recommended

Considering that from 1932 to 1937, 8429 passenger cars have been air-conditioned, one realizes that a very fine job of air-conditioning has been accomplished. There remains, however, much to be done to attain the desired optimum of conditions within the car.

It is therefore suggested that the following further studies be made:

(*1*) *Temperature Control*—Full-automatic modulated control of temperature and humidity is required. Such a control system should provide for a co-ordination of heating and cooling. Therefore, experimental work should be pursued so that satisfactory full-automatic modulated control systems may be available.

(*2*) *Location of Fresh-Air Intake*—It has been determined that the desired amount of fresh air may be prevented from entering a car when in service due to the following conditions: (a) Air currents set up by high-speed operation may prevent fresh air from entering the intake when it is located on the outside of the car. (b) The partial vacuum at the end of a train may prevent fresh air from entering the intake when it is located in the end vestibule of the car.

(*3*) *Batteries*—Increased lighting demand and the air-conditioning load have given rise to a number of questions with respect to batteries. Among those requiring study are: (a) An analysis of the actual requirements, (b) a determination of the real performance of different types of batteries, generating and control equipment, all of which would involve initial operating and maintenance expenses and many related matters.

(*4*) *Passenger-Car Insulation*—It has been determined that the refrigeration required to absorb the heat transferred through the car structure in approximately still air and with a 20-deg. difference between outside and inside temperatures, varies from 1.3 tons of refrigeration for a well insulated car to 3.1 tons of refrigeration for a poorly insulated car. This is a wide and expansive range. A thorough study of passenger-car insulation directed towards markedly improving it would accomplish real economy during both the cooling and heating seasons and it would also facilitate maintaining more uniform conditions in the car. The sun and air movement have a very important bearing

upon the amount of cooling and heating required and upon passenger comfort. They are a phase of the problem of insulation. Much may be accomplished through the use of reflective paints and coverings used on sides and roofs of cars and window shades; also by the design and construction of windows and the materials thereof. These and many other important factors require painstaking study.

(5) *Facilities for Servicing Equipment in Terminals and Yards*—The magnitude of terminal facilities required for air conditioning is indicated by the net charge to the investment account of $1,157,000 for 43 railroads. This is a subject of great importance both as to operations and costs and should be thoroughly studied.

(6) *Relative value of 110 volts, 220 volts, 440 volts, 3-phase, 60-cycle a.c. and 32 volts d.c. for cars equipped with an electro-mechanical air-conditioning system.*

Costs

The investment in and the cost of operation and maintenance of air-conditioning equipment have followed the general trend of all new developments. This trend was very high in the beginning but has been slowly decreasing. There has been some decrease in the cost of air conditioning. A much larger decrease should be made. The present costs are so high that they are retarding the application of air-conditioning.

An outstanding development of this research is the fact that 29 men representing 31 railroads, or 60 per cent of all air-conditioned cars, were called together prior to the start of the road testing. These men met in the Engineering Laboratory of the Ohio State University and were there instructed in the objectives of the research and in the correct use of instruments for the determination of tonnage, air velocities, temperature, humidity, proportions of fresh and recirculated air and kindred matters. They were given the opportunity in open meeting of discussing the merits and demerits of the various types of air-conditioning. Problems pertaining to operation were discussed. These men became good friends. An esprit de corps between air-conditioning engineers on connecting lines was built up which has proved invaluable. During the past year many of these men have been confronted with problems, have consulted with the Division of Equipment Research and both principals have benefited. I have been advised by representatives of air-conditioning manufacturers that their job has been made simpler because the railroad air-conditioning engineers know what they want and, with the use of uniform instrumentation and calculation, insist upon getting what they pay for.

Another interesting development has been the interest manifested by foreign countries. The Division has been contacted by representatives of South Africa, South America, Australia, Germany, France, Japan and other nations and considerable business has accrued to air-conditioning manufacturers and instrument makers as a direct result of the research.

I am safe in saying that requests for the air-conditioning engineering report have been received from practically every country in the civilized world requiring air-conditioning.

The meeting then adjourned.

Railway Supply Industry Has a Common Purpose

By F. N. Bard *

The remarkable exhibit which the Railway Supply Manufacturers' Association is giving this year stimulates the imagination and shows what can be done in demonstrating to our railroad friends and those of the public who invest in our securities and the securities of the railroads, and those officials of the states and federal government who are interested in safe and efficient transportation, what our industry has to offer.

The great problem today, after the product has once been perfected and established, is merchandising, and the railway supply craft must develop a high degree of technique in the exhibiting and selling of their products, without increasing the expense unnecessarily or increasing the number of exhibits, with a consequent strain on the personnel of the various supply companies.

Must Present United Front

The railway supply industry must present the full force of a united front, with the best brains in its possession and the best method of organizing itself which is available, if it is to maintain its identity as a craft and present a true picture of its contribution to the development of rail transportation and its enormous facilities for furnishing the highest grades of material to meet the most exacting requirements of modern transportation, and at low cost. It is doubtful if there is a sufficient reservoir of capital in this country to produce within the railroads or outside of the present railway supply craft, the facilities which are at present available in our own group to supply transportation material needs. The railway supply industry has absorbed enormous losses in developing its product and has built up a tremendous reservoir of technical experience and technical brains, which are constantly available to transportation.

To obtain the highest degree of solidarity and the most efficient merchandising of our product, the fullest understanding on the part of our railroad friends, and the public and public officials, of our facilities and abilities, we should not be divided as to leadership into the various groups of maintenance of way, motive power, car, signaling, etc. In the exhibition of our products a degree of specialization is necessary and a good example of such specialization is a differentiation between rolling stock and track equipment. There should be no differentiation in the leadership behind the effort to properly present and merchandise the products. This leadership should draw into it the best minds and the best abilities available in our craft. The fulltime leadership of a man of outstanding ability may be a proper method to follow.

Urges One Leadership

The Railway Supply Men's Association for a great many years has shown outstanding ability in the management of the exhibits and the presentation of the products of its members. The various associations in charge of track specialities and working in co-operation with the smaller railroad associations, have shown outstanding ability. The time has come, however, when all of these groups should be united under one leadership and should merge their interests under that leadership, in a wholehearted effort to do a really big job for the railway supply industry, at a time when we are facing more serious problems than at any time in our history—not only problems of meeting the extreme demands of transportation, but economic and social problems as well.

I suggest that the Railway Supply Men's Association, through their executive committee and their officers, study this question and invite the officers and executive committee members of the other interested associations to sit in with them, in an effort to effect the co-ordination of our leadership, and that it be done promptly enough so that any important exhibitions or meetings in which the railway supply industry is interested, may be under this leadership in the future.

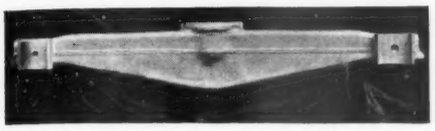
* President, Barco Manufacturing Company.

New Devices . . .

Truck Bolsters of Welded Rolled Steel

The Carnegie-Illinois Steel Corporation, Pittsburgh, Pa., is exhibiting truck bolsters of welded rolled-steel construction, developed by the Railroad Research Bureau of the United States Steel Corporation subsidiaries.

The bolsters are built of two U-shaped halves, the top half being inverted over the lower half to form a box section. Each half is pressed from a special rolled section of plate having a central portion thicker than the edges. These thicker portions form the top and bottom of the bolster, thereby placing more metal in the most favorable position to withstand the bending stresses. The top and bottom sections are welded together on each side of the bolster. The junctions of the sections have been made straight to facilitate automatic welding. Suitable stiffeners are welded inside the bolster under the center plate and side bearings and at the ends. Separate center plate and column guides are also welded to the bolster. The illustration shows a bolster of this type for 5½-in. by 10-in. trucks.



The U.S.S. 50-Ton Welded Rolled-Steel Truck Bolster

Results From Tests of A.A.R. 50-ton Welded Rolled Steel Truck Bolster

Transverse test:	
Loading, lb.	82,000
Allowable deflection, in.	0.0750
Actual deflection, in.	0.0565
Loading, lb.	154,000
Allowable set, lb.	0.0250
Actual set, in.	0.0005
Side Bearing:	
Loading, lb.	120,500
Allowable deflection, in.	0.0550
Actual deflection, in.	0.0365
Loading, lb.	192,500
Allowed set, lb.	0.0250
Actual set, in.	0.0015
Center plate:	
Loading, lb.	120,500
Allowable deflection, in.	0.0750
Actual deflection, in.	0.0705
Loading, lb.	231,000
Allowable set, lb.	0.0250
Actual set, in.	0.0020
Maximum loading required minimum, lb.	423,500
Actual loading, lb.	499,600
Weight of bolster, lb.	780

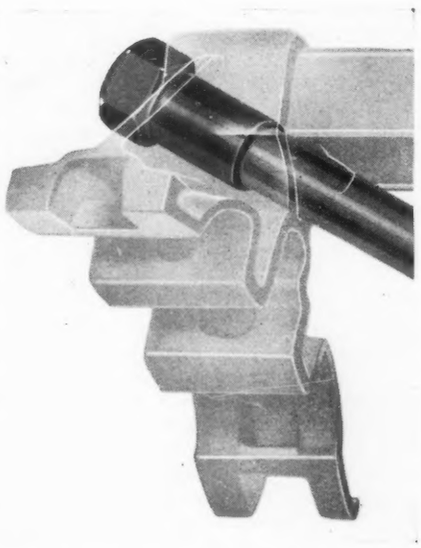
Results of A.A.R. approval tests are given in the table and, for comparison, the design test requirements are also listed. It is particularly noteworthy that the actual sets are negligible, as compared to those allowed by the specifications. In curves plotted during these tests, the deflections produced by transverse, side-bearing, and center-plate loading increased uniformly, up to and beyond the set load, except in the side-bearing test where a deviation began just before the set load was reached. The actual maximum load of 499,600 lb. was well in excess of the minimum requirements of 423,500 lb.

The linear variation of deflections, negligible sets and the ample margins by which the bolsters met the specifications are features which demonstrate the strength and rigidity of the welded rolled-steel construction. It is significant that in none of the tests carried out during development of the design have there been failures in the main stress-carrying welds on any bolster.

Sleeve Nut Prolongs Brake-Beam Life

The Chicago Railway Equipment Company is exhibiting a recently developed improvement in standard brake-beam construction designed to prolong the life of tension rods. The improvement consists of applying the Creco sleeve-nut, shown in the illustration.

In brake beams of conventional construction the slight weaving of the brake head, which occurs in application of the brakes, has the effect of concentrating truss-rod stresses in a limited area at the base of the nut. Truss-rod breakage almost always occurs at that point, and has been the chief cause of brake-beam failure in the past. The Creco sleeve-nut surrounds the tension rod and carries the flexing effect away from the base of the nut seat and throws it into the long span between the brake head and the fulcrum, where it does no damage.

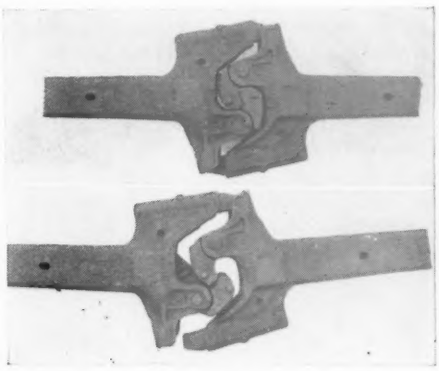


Creco Sleeve Nut as Applied to a Standard Brake Beam to Prolong Tension Rod Life

A.A.R. standard brake beams and those embodying Creco sleeve-nut construction have been under continuous comparative tests for some time and these comparative tests are said to have shown that the Creco sleeve-nut eliminates the breakage of brake-beam tension rods.

Controlled-Slack Passenger-Car Coupler

The illustrated coupler is designed with a controlled-slack feature as an economical means of securing much of the benefit of tight-lock couplers in existing equipment, the construction of which equipment does not lend itself readily to the application of tight-lock couplers. With the controlled-slack coupler, free slack between contours is completely eliminated by the use of resilient plungers in the coupler guard arm which engage lugs on the knuckle side of the opposing coupler head and also by the use of resilient faces incorporated as a part of the knuckles. The cushioning action of the couplers, with that of the platform buffers, serves as a small draft gear supplementing the standard draft gear which starts movement well before their maximum travel is reached. This auxiliary draft-gear action controls slack between couplers, maintains proper spacing of cars in starting and running trains, absorbs shocks of low intensity, and dissipates much objectionable noise.



Top: Alliance No. 2 Controlled-Slack High-Tensile Steel Couplers in Normal Coupled Position—Below: The Couplers in the Act of Coupling at an Angle

The controlled-slack coupler meets the fundamental requirements which have been established by the A.A.R. for strength, economy, interchangeability, and both vertical and horizontal angling. The coupler and all operating parts are completely interchangeable with the present Type E coupler. It is applicable to existing equipment without changing car construction, except for possible relocation of train lines. The coupler is furnished in either Grade B or high-tensile steel with but little increase in weight.

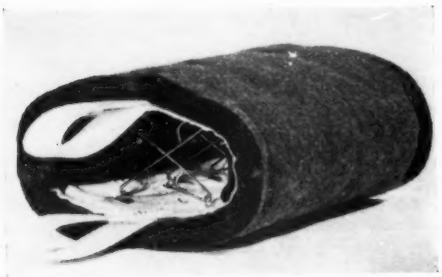
For passenger equipment where light weight is of fundamental importance the Alliance No. 2 controlled-slack coupler of high-tensile steel is available. This coupler

incorporates all the features outlined above and couples with all existing couplers.

Utilizing only the cushioned Type E knuckles in existing D or E couplers will reduce much of the slack in the present contours. The type E controlled-slack coupler and the type E cushioned knuckle are offered by the manufacturers of the standard coupler and may be seen at the exhibit of the American Steel Foundries, Chicago.

Stapax Positive Journal Lubricator

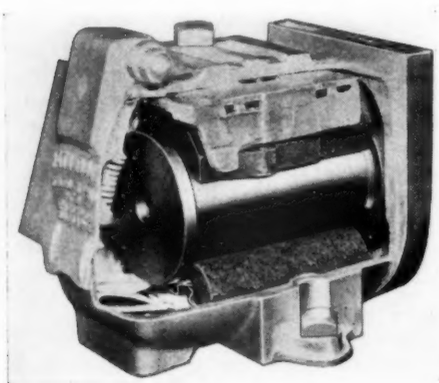
The Stapax positive journal lubricator being exhibited by the Lubrication Products Company, Cleveland, Ohio, and recently developed for service on railway equipment, consists of a combination of flat steel springs and felt formed in a cylindrical shape, whereby the capillary action of the felt feeds oil to the journal surface, and the spring action of the steel



Stapax Pad, Made of a Combination of Flat Steel Springs and Felt, with Positioning Cross Wires to Prevent Rolling

holds this felt in constant contact with the journal.

Steel springs of special quality are fastened into a canvas core, which in turn is sewed into the inside felt core. This felt core is then inserted in the outside core and through this method of lamination, the minimum amount of stitching is required in the surface to contact the journal. After this assembly is complete, music-wire spiders are inserted, which serve two purposes: First, to form the pad to its proper shape and, second, to prevent the pad from rolling with the journal.



Stapax Positive Lubrication Pad As Applied in a Conventional Journal Box

When heavy oil is used in a journal box and comparatively low temperatures are experienced, there is a tendency for any material contacting the journal to follow the revolving surface when the first movement takes place. In the case of waste, this often causes a waste grab and if the Stapax pad were not equipped with these spiders, it would follow the surface and roll up in the corner of the box. However, when such action tends to take place in either direction, one of the wires in the spider immediately becomes a tension member and prevents such rolling action.

Owing to ample flexibility lengthwise, Stapax lubrication pads can be applied to the existing journal boxes with little effort and require no remodeling or revamping of existing equipment. In extensive comparative tests of Stapax pads and conventional waste lubrication, conducted on a test machine at Purdue University, a reduction of 2 deg. F. to 35 deg. F. in brass temperature was shown and Professor G. A. Young stated at the conclusion of his report: "The results of this investigation demonstrates the fact that the Stapax pad reduces friction, as indicated by the lower temperature of the brasses, and requires less power to operate the test axle, eliminates the possibility of waste grab, uses less oil, is easy to put in or take out, and, within the limits of these tests, showed no signs of wear, glazing, sagging, or misplacement."

Steam-Heat Specialties For 2½ and 3 In. Lines

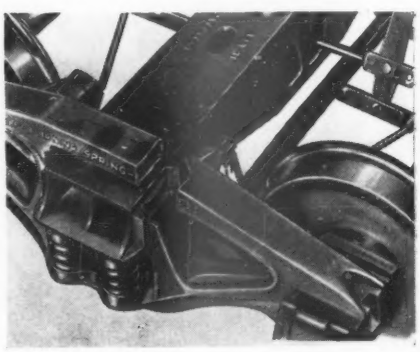
Owing to the tendency toward an increase in the size of steam-heat connections between cars over the present 2-in. connections, the Gold Car Heating & Lighting Company, Brooklyn, N. Y., has developed and is exhibiting end train-pipe valves and steam coupler connections for 2½-in. and 3-in. lines. This company is also exhibiting a pressure regulating valve with flanged connections, the connection size of which is either 2 in. by 2½ in. or 2½ in. by 3 in., according to the requirements. These regulating valves are constructed similarly to other Gold regulating valves, with the control valve accessible from the outside of the valve body and with renewable valve seats.

The Gold 2½-in. and 3-in. end train-pipe valves are made with malleable iron bodies. Their standard cam-and-piston action of operation has been adhered to, which action gives the utmost freedom of operation. The stem is so arranged in the packing gland that it has a rotating instead of a reciprocating motion, thereby giving assurance against steam escaping at this point. There are but two working parts, the cam and the piston, reducing maintenance to a minimum. Condensation relief is provided by two small notches on the face of the piston. A quarter turn fully opens or closes the valve, no intermediate position being necessary.

The Gold steam couplers for 2½-in. and 3-in. connections are of a design permitting ease in coupling and uncoupling, yet can be securely locked in position by a special locking arrangement. There is no lifting necessary to couple and uncouple. Gold oscillating gaskets of compressed metal are used. A gravity trap is used for relief of condensation.

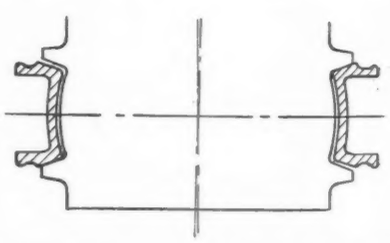
Self-Aligning Truck Without Spring Plank

The established truck manufacturers who are cooperating in engineering and research under the Four-Wheel Railway Truck Agreement are offering for high-speed freight service the self-aligning spring-plankless double-truss truck the standard designs of which permit wide latitude in accommodating individual railroad's preferred spring groups and specialties, and eliminates the weight and cost, both initial and maintenance, of spring planks. Since the introduction of the truck, applications have been made to 38,000 new



Bolster Arrangement of the Self-Aligning Spring-Plankless Double-Truss Truck

cars. The general characteristics of modern double-truck side-frame design have been embodied in this truck which has passed successfully all the latest A.A.R. physical test requirements and has been approved for general service application by



Connection Between the Side Frame and Bolster of the Spring-Plankless Truck

the A.A.R. Committee on Car Construction.

The bolster of this truck retains the side frames in their proper relationship laterally, but affords sufficient flexibility, within limits established by bolster clearances, for them to assume the most satisfactory longitudinal relation determined automatically by the wheel-and-axle assemblies in running service. Restraint to this automatic positioning adjustment of side frames is

exercised through the truck springs which, with the coning of the wheel treads, act to return the truck to normal when the need for other positioning has passed. The connection between the side frame and the bolster is through the engagement between cylindrically concave surfaces of the side-frame columns and cylindrically convex bolster surfaces, as shown in the drawing. The shape of these large contact surfaces insures full bearing area under any condition of bolster angularity. Angularity is limited by wide flaring or radial stops on the bolster which fully contact the beveled edges of the side-frame columns.

In the design of both the side frame and the bolster of the self-aligning truck many important features have been incorporated to develop the maximum strength of each member at minimum weight. The brackets are cast integral on either the side frames or the bolster so that the trucks can also be arranged to accommodate any of the various designs of brake-beam supports or guides approved by the A.A.R. Committee on Car Construction. Spring groups may be either all coils, coils and snubber, or coil-elliptics. Springs are retained by the use of a high flanged spring plate. While the truck illustrated shows integral journal boxes and the brake-lever connection passing through the bolster, the trucks are also designed with separable boxes and for the bottom connection to pass below the bolster, to suit the customer's requirements. Further saving in weight may be obtained by the use of high-tensile steel for frames and bolsters and trucks of this material have the full approval of the A.A.R. for interchange service.

The self-aligning truck is recommended to the railroads by the following licensed manufacturers: the American Steel Foundries, The Bettendorf Company, The Buckeye Steel Castings Company, the Gould Coupler Corporation, the Scullin Steel Company, the Pittsburgh Steel Foundry Corporation, the Birdsboro Steel Foundry & Machine Company, The Ohio Steel Foundry Company, and the Columbia Steel Company.

Light-Weight Parts for Foundation Brake Gear

The Schaefer Equipment Company, Pittsburgh, Pa., manufacturers of light-weight foundation brake gear for freight cars, is exhibiting a recently developed

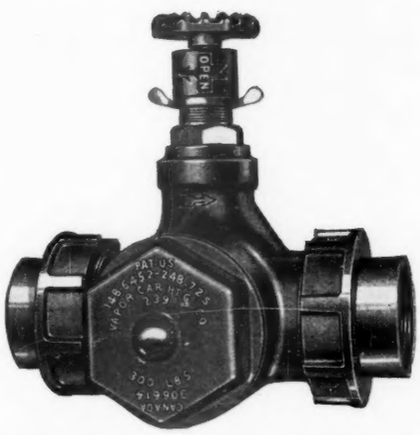
Schaefer Self-Lock Brake-Shoe Key

light-weight line of parts for this gear. The principal features of the gear are oil-quenched levers; a light-weight connection, and the use of Man-Ten steel in all tension rods and their jaws. The jaw is of a design which reduces the weight to practically one-half that of the standard A.A.R. unit. This brake gear, complete, reduces the weight of the A.A.R. gear by approximately 164 lb.

In addition to these light-weight foundation brake-gear parts, this company is exhibiting the Schaefer "self lock" brake-shoe key made of wear-resisting steel. This key was developed two years ago and has since been used on over 100,000 cars. These applications have been made on only two railroads, no effort having been made up to the time of the recent approval of the A.A.R. Interchange Committee to introduce the key beyond the initial installations. The key is designed on a three-leaf principle to hold the brake shoe tight during its entire life, thus reducing the wear on the brake head which accompanies loose shoes. A key subjected to a test of one-half million reverse oscillations of the shoe against the brake head showed no wear. Besides this company's exhibit, this brake key can be seen on the Bessemer & Lake Erie 70-ton hopper cars at the track exhibit.

Larger-Capacity Steam-Heat Valves

The Vapor Car Heating Company, Chicago, has developed and is exhibiting 2½-in. steam-heat specialties to provide for handling the substantially increased amount of steam required in heating longer pas-



Vapor Reducing Valve, No. 239, with Full 2½-In. Port Throughout

senger trains. The use of full-opening 2½-in. stop and reducing valves, and a 2½-in. steam-heat pipe to the rear of the tender, will reduce the pressure drop by 15 to 20 lb. as compared with the use of 2-in. steam heat specialties.

The Vapor 2½-in. stop valve, No. 210, has been designed to provide a seat lift double the requirements or standard recommendations in order to minimize the pressure drop through the valve.

Vapor pressure-reducing valve, No. 239, is designed with a full 2½-in. port throughout, the area of the valve seat being increased to compensate for the valve stem and thus provide a full area throughout the valve. The design also provides both a main valve and an auxiliary main valve so that small demands for steam, as well as maximum demands, may be supplied as required without the wire draw common when attempting to throttle down steam deliveries through reducing valves.

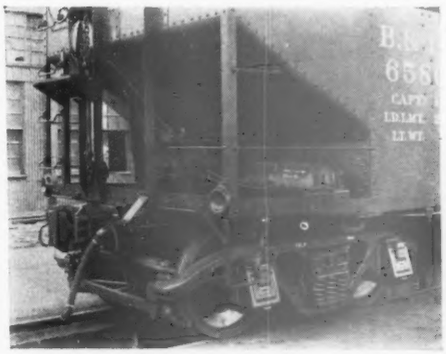
This 2½-in. reducing valve maintains in its construction the desirable feature of a removable piston cap, which permits the renewal of piston and cylinder walls quickly without the necessity of removing the valve or disturbing the pipe connections on the locomotive.

Empty-and-Load Brake Automatic Changeover

Among the exhibits of the Westinghouse Air Brake Company, Wilmerding, Pa., its new empty-and-load brake, with automatic feature of changing from sixty to load brake operation, for light-weight high-capacity freight cars. A complete operative equipment is displayed in such manner as to emphasize that it is built upon the standard AB equipment by the addition of but a few parts, and to demonstrate its automatic feature.

The AB valve used is substantially the same as the standard type and has equivalent control features. A changeover valve, a simple adjusting mechanism, and a load cylinder are added. The changeover valve serves to direct the flow of air from the AB valve to only one cylinder when the car is empty, and to both cylinders (in sequence as with former empty-and-load equipments, and for the same purpose) when the car is loaded. The changeover valve is set for empty or load requirements by an adjusting mechanism, the relative position of which depends upon the truck-spring deflection as determined by the car loading.

The adjusting mechanism comprises a strut cylinder, having two pipe connections to the change-over valves, mounted on the end of the truck bolster, and a pistol stop on the truck side frame. During recharge periods air is admitted to the strut cylinder. Its piston then moves down into contact with the stop. When the car is empty, the body rides high and the piston can descend to its lowermost position to uncover a port in the cylinder wall, permitting air to flow back to the changeover valve and cause it to assume empty position, in which only



Car Equipped with Automatic Changeover for Empty-and-Load Brake Equipment

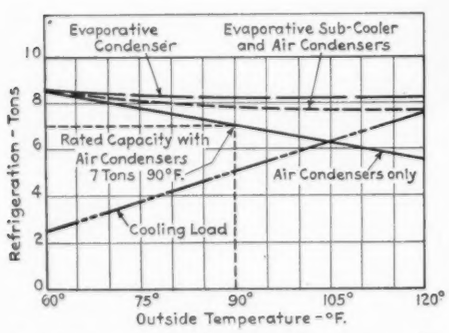
one cylinder functions. When the car is more than half loaded the body is lower, and consequently the strut piston cannot descend far enough to uncover the port in the cylinder wall, and no air flows back to the changeover valve, which therefore assumes load position to bring both cylinders into action.

After each adjustment, the changeover valve is locked in its adjusted position and, as the pressure in the system continues to build up, air is exhausted from the strut cylinder and its piston withdraws from the stop, thus preventing car vibration from causing wear or false adjustment.

The Westinghouse Air Brake Company's exhibition rack includes a truck side frame with wheels and a truck bolster with provision for raising and lowering it to simulate empty and loaded car conditions, thus demonstrating the automatic adjustment, and operation of cylinders under both conditions. A pointer and dial indicate the braking force developed, and lights show when the equipment is set for empty or load position.

Air-Conditioning Unit For High Temperatures

An evaporative sub-color and an evaporative condenser for use with gas powered railway refrigeration units exhibited by the Waukesha Motor Company, Waukesha, Wis., is designed to operate in conjunction with the Waukesha railway ice engine. The sub-cooler, of value where portions of a run are made with operating temperatures of more than 100 deg. F., produces a refrigerant-liquid temperature and head pressure to provide an operating condition equal to or lower than an 85 deg. F.



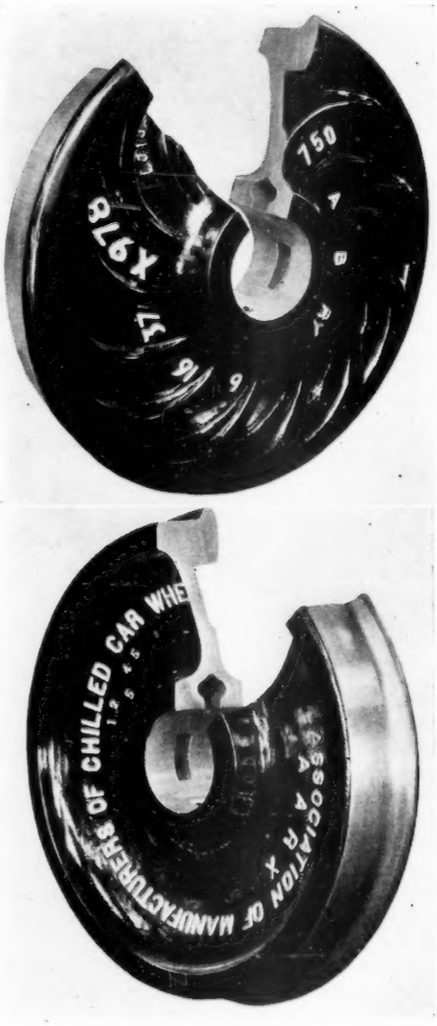
Comparison of Ice-Engine Performance with and without Evaporative Sub-Cooler and Condenser

dry-bulb temperature under the most extreme weather conditions. Equipped with a fin-type cooling coil, circulating water pumps, blowers, an air filter, a spray, a ¼-hp. 32-volt electric motor, and a 40-gal. water tank, it is compactly constructed to provide light weight and to occupy a minimum amount of space. Its operation is auxiliary to the ice engine, but it may be used or not used at the operator's choice. Water consumption in extremely hot weather is 4 gal. per hr.

The Waukesha evaporative condenser is also designed to operate in conjunction with the Waukesha railway ice engine. It differs from the sub-cooler in that it provides a larger water supply and condensing capacity which makes it suitable for long runs where the temperature is above 100 deg. F. at all times. In this type of installation, all the refrigerant is cooled in the condenser, eliminating the choice of using or not using provided by the sub-cooler. Equipment includes a fin-type cooling coil, a circulating water pump, a blower, a filter, sprays, and two 32-volt motors of ¼ hp. and ¾ hp., respectively. It has a water supply of 175 gal., and during extremely hot weather, the consumption is 17 gal. per hr. The illustration shows a comparison of ice-engine performance with and without these two combinations.

Bracketed Chilled-Car Wheel with Cored Hub

The illustration shows front and back views of the new design of chilled car wheel for cars of 50 tons capacity, having 5½-in. by 10-in. journals. A radial section has been cut from the wheel to show the general design and specifically to show the cored-out hub and brackets, intended



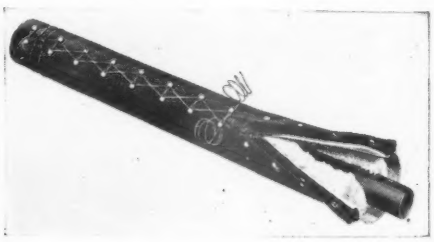
Front and Back Views of the Bracketed Chilled-Car Wheel

to give increased strength for severe classes of 50-ton service. A request has been made to the A.A.R. Committee on Wheels for permission to manufacture, for experimental purposes, 10,000 of these wheels for application under 50-ton cars. This wheel is being exhibited by the Association of Manufacturers of Chilled Car Wheels, Chicago, Ill.

Insulation for Curved And Straight Pipes

Unarco Wovenstone pipe covering, designed as a high-efficiency insulation for the general run of curved and straight pipes, is being exhibited by the Union Asbestos and Rubber Company, Chicago. It is composed of an all-asbestos insulating medium enclosed in a waterproofed asbestos jacket. Wovenstone is said to be extremely flexible, permitting it to be applied where ordinary covering cannot be used; that is, to bends, nested piping and other difficult locations.

Because of its construction it is said that this covering will not shake down or disintegrate under the severest vibration of road service, is not affected by moisture or fire, and may be easily removed and reapplied when necessary without damage. Wovenstone is simply placed around the pipe and laced and clamped in place. Because of its sealing features, it becomes



Wovenstone Pipe Insulation Can Be Laced on Straight and Curved Pipes

practically a one-piece covering over the entire length of the pipe. It is furnished regularly in 3-ft. sections, but may be furnished in any desired length up to 8 ft. without extra cost. It is shipped flat, requiring less space than formed sections, both in shipping and storing.

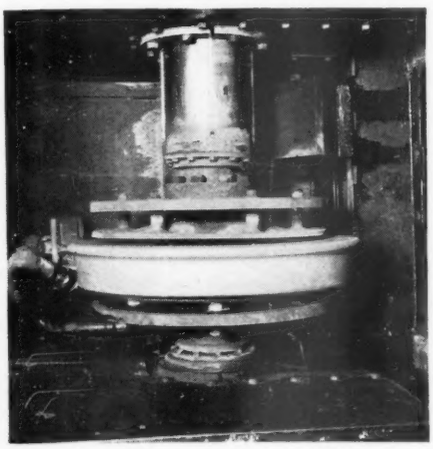
The T-Z Locked Tender Tank Valve

The T-Z Railway Equipment Company, Chicago, is exhibiting a recently developed tank valve designed for application to new as well as to existing tenders. It has a reversing operating gear which locks the valve in either wide-open or closed position, thereby supplying a full volume of water from the tender to the injector with the elimination of waste and the hazard of fouling in a partially open position. It is accessible from beneath the tank for removal or repairs and is designed to fit in close clearance with proper operation. The hose connection at the outlet can be designed to suit any required condition.

Uniform Heat-Treatment Of Wrought-Steel Wheels

Precision control is a feature in the heat-treatment of wrought-steel wheels at Bethlehem Steel Company's wheel plant at Johnstown, Pa. The three major operations of heating, quenching, and drawing are controlled almost entirely automatically, insuring unusually uniform results. A model of the heating furnace employed is being exhibited by the Bethlehem Steel Company, Bethlehem, Pa.

The heating furnace is of the rotary type with a capacity of 54 36-in. wheels. It is divided into four heating zones, with a baffle wall between the charging and the discharging doors to separate the first and the fourth zone. In the first zone, where the cold wheels are placed, the temperature is gradually increased to 1,200 deg. F. In the second zone the wheels reach a temperature of 1,400 deg. F., while the third and fourth zones are maintained at 1,600 deg. F.



Quenching a Wrought-Steel Wheel. The Wheel Is Clamped Between Two Revolving Discs Which Protect the Web and the Hub While Water Is Sprayed Against the Rim

The most important feature of this furnace is the absence of manual control. Potentiometers control the temperature of the heating zones, and the temperature and the pressure of the fuel are regulated automatically. The rotation of the hearth, which occurs in steps equal to the width of the furnace door, is controlled by an automatic time clock. This clock can be set to give any desired variations in the heating time.

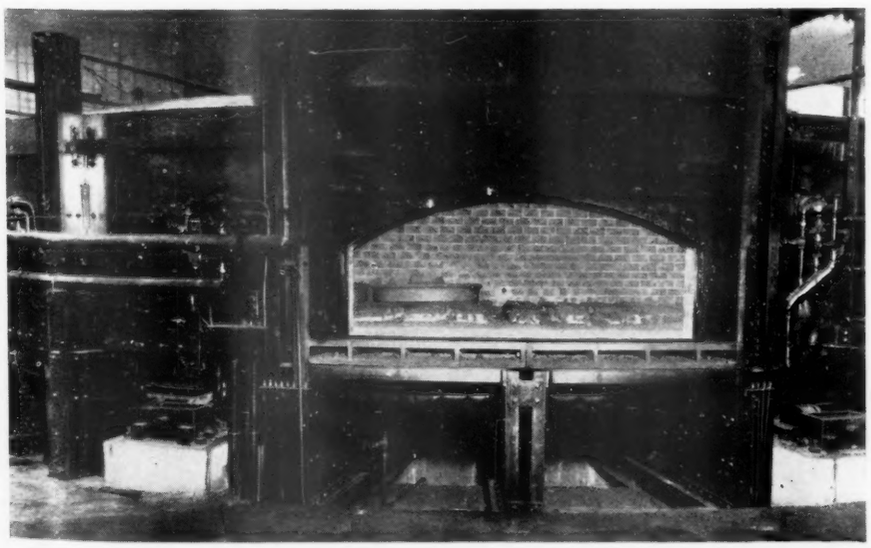
In the process of manufacture the wheels, after being forged, rolled, and coned to the required shape, are allowed to cool down slowly to room temperature. After careful inspection they are then taken from the transfer platform and placed, one at a time, on the vacant part of the hearth, when the charging door opens. In the same manner, when the discharging door is opened, a wheel, now at the proper quenching temperature, is removed from the hearth and lifted over to one of two independently operated quenchers. All these operations are so controlled by the automatic timing device that each wheel remains in the furnace exactly the same length of time.

After quenching, the wheel is transferred to a drawing furnace which is similar in design to the heating furnace, except that a combustion chamber is placed above the hearth and separated from it by a perforated arch. This transfer is made in minimum time to prevent excessive chilling action by the air.

The drawing furnace is dividend into three zones in which a temperature of 950 deg. is automatically maintained. It is slightly smaller than the heating furnace, and has a capacity of 30 36-in. wheels. The details of operation are the same as for the heating furnace.

After drawing, the wheels are placed in cooling pits where they are slowly brought down to room temperature. This is done to protect them from drafts, an important consideration, particularly in cold weather.

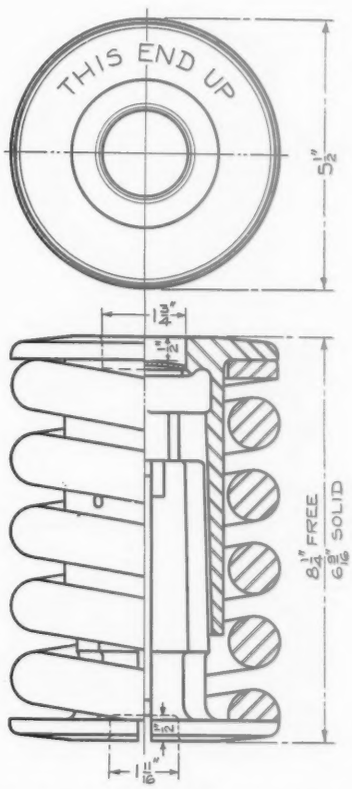
The capacity of the plant is rated at 15 passenger-car wheels of 36-in. diameter per hour. Provisions have also been made for treating wheels up to 54 in. diameter. The carefully synchronized layout and the extensive automatic control and timing have made it possible to obtain results of a high degree of uniformity.



This Heating Furnace, with Revolving Hearth, Holds 54 Wheels of 36 In. Diameter. The Rotation Is Governed by Time Clock, and the Temperatures Are Automatically Controlled

Truck Snubber Unit Reduces Spring Action

The Symington - Gould Corporation, Rochester, N. Y., has developed and is exhibiting the Symington truck snubber unit designed to reduce cumulative truck spring action induced by rhythmic impulses from rail, wheel or other external forces. The unit is proportioned to replace a double-coil spring in the usual spring group. It has an outside diameter of 5½ in., a free height of 8½ in., and travel of $1\frac{11}{16}$ in.

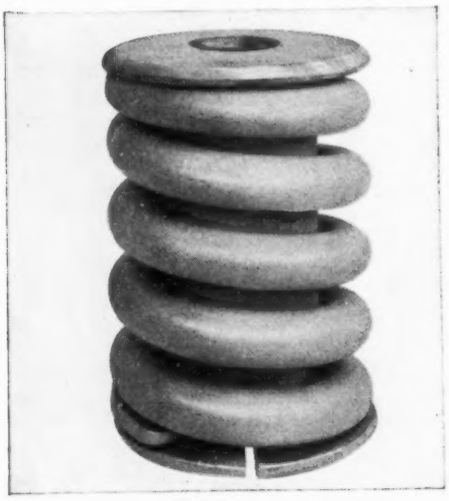


Sectional View of the Symington Truck Snubber

In appearance the unit is a simple flanged spool with a helical spring around its body. The spool is in three pieces, the upper portion being formed by the top flange and the body shell, and the lower portion by two tapered internal shoes, each forming one half the bottom flange. Pocketed in these shoes is a pack or nest or pre-curved plate springs which expand the shoes in frictional contact against the inner wall of the upper shell. Due to the slight angle of the friction shoes the deflection of the plate springs is relatively small and fiber stresses are maintained at a moderate figure insuring uniform capacity for the unit over a long period of time. One of the features of the device is the uniformly increasing frictional

resistance throughout the entire travel with uniform release and effective frictional absorption of energy.

The housing and friction shoes are of heat-treated alloy steel to reduce wear to a minimum. The top and bottom flanges are crowned to permit normal movements of the bolster without imposing concentrated loads on the edges of the flanges or affecting proper contact of the friction surfaces. The use of separate spring systems for friction and release insures smooth action and



Symington Truck Snubber Unit Designed to Reduce Cumulative Truck Spring Action

lead inserts in the friction shoes prevent abrasion and sticking.

The unit is self-contained, held in correct assembly by a pin in double shear, and is arranged with a small amount of pre-compression to assure definite functioning of the parts under spring movement.

Brake Cylinder of Improved Design

The Westinghouse Air Brake Company, Wilmerding, Pa., has developed and is exhibiting an improved design of brake cylinder, designated as the Type U, which embodies a number of features that contribute toward more satisfactory operation and economical maintenance. Dirt is excluded, lubrication is better, and the periods between cleaning very materially extended.

The pressure head and cylinder body are combined into one casting. The piston has a snap-on type of packing cup that does not require the use of a follower plate. Both features permit a considerable reduction in weight. A groove around the piston, back of the packing cup and in front of a felt swab, is packed with grease that provides constant lubrication of the cylinder wall. Four small tapped ports, which open into the grease groove when the piston is in release position, are used for introducing lubricant in whatever position the cylinder may be installed.

The entrance of dirt is prevented by a piston-rod lubricator and protector consisting of a felt swab and three bronze rings, which are packed in grease and serve to lubricate the piston rod as well as to seal the interior of the cylinder against dirt and moisture. Since atmospheric air must enter the non-pressure head during release movement of the piston, the non-pressure head is fitted with a strainer. This is of the removable-cartridge type held in place by a spring and protected by a breather cover which prevents flying dirt and water contacting directly with the strainer.

The piston-rod sleeve protector serves to prevent the hollow piston rod from becoming battered at the outer end and to hold the assembled piston, release spring and non-pressure head together when necessary to dismantle the brake cylinder for cleaning and lubrication.

This type of cylinder, applicable to any form of air-brake equipment, may be seen on the empty-and-load brake demonstration rack and on several of the cars and locomotives among the track exhibits.

Unit Truck with Redesigned Brakes

The Buffalo Brake Beam Company, New York, is exhibiting a freight-car truck foundation brake arrangement that eliminates the conventional brake hangers, brake-beam supports and adjusting devices. Brake-beam guides are cast integral on the inside of the cast-steel side frame adjacent to the car wheel with an opening into the side-frame window. The location of the guides, as shown in the illustration is along the tension member of the truck side frames and is at an angle of approximately 12 deg. to the center line of the axle. This design adds strength to the frame member at its converging line and provides for the least possible weight to be added to the truck side frame. The bottom section of the guide is a continuation of the spring seat.

The brake beam is applied when assembling the truck in the same manner as the present truck bolster. The extended ends are inserted in the guides and the levers connected. The interlocking the brake beam with the truck thus effected makes it possible to remove the brake beam only by a manual operation. However, it is not necessary to dismantle the truck to remove or replace a brake beam. This can be done by removing one brake head, jacking the truck bolster and allowing the beam to slide out the rear opening of the guides.

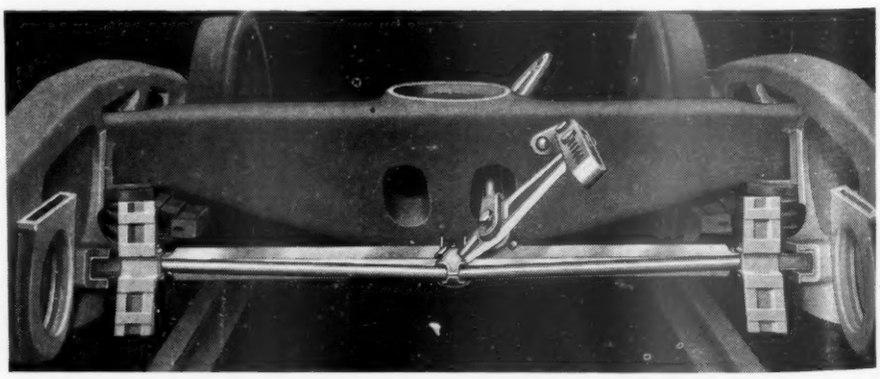
The brake beams are of the floating type and operate in the guides by a sliding movement, always on a direct line to the center line of the axle. Release is by gravity due to the angle of the guides. Large bearing areas of the guide reduce rattle and wear to the minimum. Different thicknesses of shoes will not cause the torsional strains in the brake beam since the beam can adjust itself freely to this condition. Furthermore, it is said that the beam will follow the wheel tread ideally as the beam is suspended adjacent to the wheel tread. The use of guides as a means of supporting the brake beam was adopted to assure even and full brake-shoe wear.

Both the side-frame guides and the brake-beam bearing surfaces are protected by $\frac{3}{16}$-in. spring-steel wear plates which can be replaced when necessary. This foundation brake has 100 less parts and weighs 200 lb. per car less than previous designs.

Franklin Reverse Gear

The Franklin Railway Supply Company, Inc., New York, has developed and is exhibiting a rotary valve for Franklin Type B and Type E lever reverse gears which is optional in place of the slide valve previously used with these gears. The rotary valve eliminates the necessity of disconnecting any piping to the reverse gear in order to remove the valve and seat for repairing or applying new parts. The rotary valve is easily operated and makes the gear more sensitive than when operated by the slide valve.

This company is also exhibiting a Precision reverse gear which is designed for locating between the locomotive frames, incorporating miter-gear boxes in the operating shaft for this purpose. This has been done to reduce the effect of possible distortion in the reverse shaft which may affect the equality of cut-off on the two sides of the locomotive.

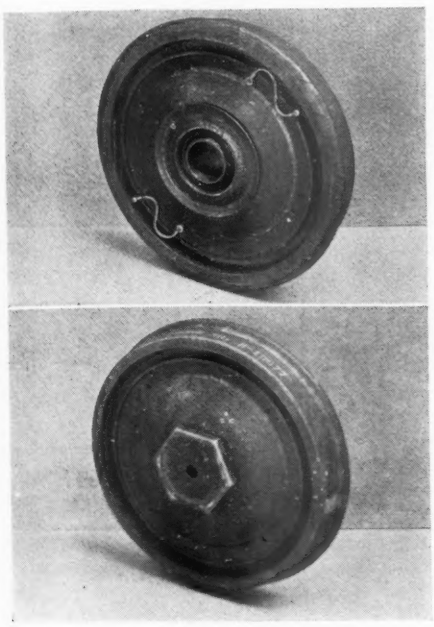


Buffalo Unit Truck with Foundation Brake Gear Which Has 100 Fewer Parts and Weighs 200 Lb. Per Car Less Than Previous Designs

Resilient Car Wheel Has Rubber-Disc Inserts

A resilient type of car wheel which has been applied extensively in street railway service is being exhibited by the Lorain Division of the Carnegie-Illinois Steel Corporation, Pittsburgh, Pa. It was developed as a part of the research program sponsored by the Electric Railway Presidents' Conference Committee and conducted under the direction of Dr. C. F. Hirshfeld.

In the development of trucks for street railway service, it was found desirable to reduce the unsprung weight and to minimize the transmission of high frequency impulses and noise from the wheels to the body of the car. To effect this a wheel was designed incorporating rubber as a means of spring-suspending the entire weight of the car and truck above the wheel treads. This wheel has a rolled-steel web which carries the tread and rim on which the car is borne, and two outer circular steel plates, one on either side of the web, with disks of rubber between them and the web.



Resilient Car Wheels for Street Railway Service

On the inner and outer faces of these rubber disks or "sandwiches" are vulcanized thin sheets of metal which make contact with the web and the plates. These plates are in turn supported between the tire web and the outside plates so that they are readily demountable simply by removing the outside plate. In addition the rubber disks are securely held so as to maintain the relative positions of the parts at all times and to resist accelerating and braking forces. In order that the face plates will possess sufficient rigidity, cone-shaped plates are welded to their outer sides for reinforcement.

The parts of the wheel are assembled on a hub pressed on the car axle. The inner face plate on the flange side of the wheel is welded rigidly to this hub. Then in turn are placed on it a rubber sandwich, the wheel tread with its web, a second rubber sandwich, and the outer face plate. The entire assembly is drawn together and held in place by a nut which screws on the threaded end of the hub. The nut is pulled up until the rubber is compressed to an amount which holds the tire securely in place to withstand the thrusts of operation. The assembly of the wheels is such that the rubber sandwiches or the steel tires can be replaced without taking the wheel hub off the car axle.

Use of the rubber-cushioned wheels provides sufficient flexibility to reduce greatly the transmission of the rumble of the steel wheel on the steel rail, and ordinary road shocks to the body or the truck. Only the larger shocks incident to irregular track, bad joints, and the like need to be taken care of by the truck springs.

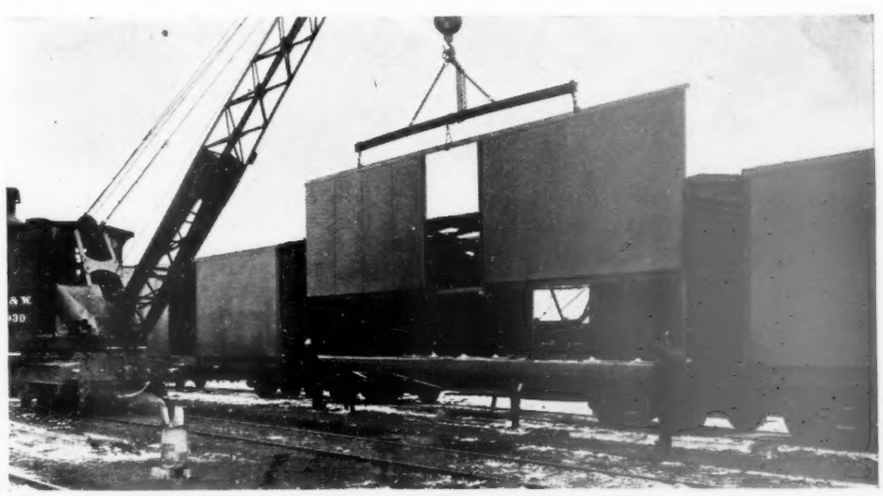
This resilient wheel is being used as standard equipment on new street cars built in accordance with designs prepared by the Presidents' Conference Committee. The maximum axle loads are approximately 10,000 lb. Service braking on the P. C. C. cars is accomplished by a dynamic brake system acting through the motors in conjunction with magnetic track brakes until the speed is reduced to 6 or 8 miles per hour. At this point the air brake cuts in automatically and completes the stop. This arrangement reduces friction on the car wheels and keeps them relatively cool, thereby preventing deterioration of the rubber.

Youngstown Steel Car Side Units

The Youngstown Steel Door Company, Youngstown, Ohio, is exhibiting steel car side units for converting double- and single-sheathed box cars and gondola cars into all-steel cars. This conversion utilizes the existing serviceable steel underframes, steel ends and roofs of the wood-sheathed cars and produces an all-steel car at less than one-half the cost of a new car of similar construction and capacity.

When the wood-sheathed car is stripped of the wooden sides, but retaining the serviceable underframe steel ends and roof, the car is ready for the application of the steel car side units. Each unit is comprised of a Z-bar side plate, to both flanges of which the upper ends of intermediate posts and door posts are riveted. The sheathing of the unit is then riveted to the side plate and to the posts. Brackets secured to the lower end of the post project inwardly and are fastened directly to the side sill; thus, the side sill constitutes the lower cord of the side-wall girder.

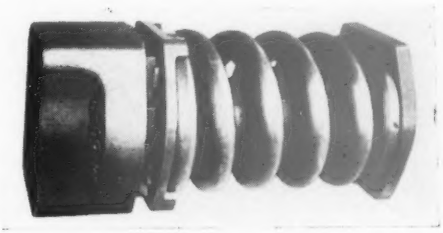
Angular members secured to and along the lower edge of the sheathing and extending from each door post to the adjacent end of the unit are also secured directly to the side sill to close the space between the sheathing and the sill and to provide supports for the ends of the floor boards. Connecting members incorporated in the unit are used to secure the sheathing to the existing car ends. By the employment of carline extensions, the existing car roof may be utilized.



Youngstown Steel Car Side Car Unit Being Applied After Removal of Wood Sheathing

National Type M-50-B Draft Gear Approved

Certificate of Approval No. 10 has recently been awarded to the National Malleable and Steel Castings Company, Cleveland, Ohio, by the Association of American Railroads for the National type M-50-B draft gear, thus making this gear acceptable for general interchange freight service, both on new and old equipment. The principles involved in this gear are the same as have been used by the National



The National Type M-50-B Draft Gear Recently Approved by the A.A.R.

Malleable and Steel Castings Company in their freight gears for the past twenty years. An external wedge member grips a pair of friction shoes and forces them inwardly against a centrally located friction member, moving them along that member against the resistance of a spring and against the frictional resistance set up by the contact between the shoes and central friction member. All wedging and friction surfaces of shoes and friction member are accurately machined and fitted. The materials and heat-treatment of all parts are the same as are used in the National type M-17-A draft gear which is made under A.A.R. Certificate of Approval No. 2.

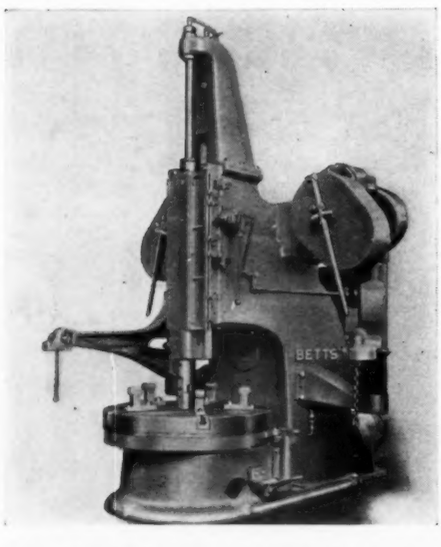
The weight of the National type M-50-B draft gear is 245 lb. per gear and the dimensions are 20⅛ in. by 8-15/16 in. by 8-15/16 in. The minimum and maximum gear travel is 2½ in. and 2¾ in., respectively. When used in the standard-length gear pocket, two standard followers per gear are required. This gear can also be used to replace old gear types, usually retaining the existing gear carrier strips. It can also be used in old cars where the sill spacing is less than standard.

This gear is included in the A.A.R. coupler and draft gear exhibit, as well as among the exhibits of the National Malleable and Steel Castings Company.

Hydraulic-Feed Car-Wheel Borer

Consolidated Machine Tool Corporation, Rochester, N. Y., manufacturer of heavy machine tools and railroad equipment, has developed and is exhibiting an improved type of Betts hydraulic-feed car-wheel boring machine. This machine is semi-automatic and provides distinct advantages both in the operation of the machine and in the production which can be attained by a single operator.

The machine operates as follows: The wheel is loaded, and, as the machine is started, the chuck jaws are tightened automatically, permitting the operator at this point to attend to the removal of bored wheels to the wheel press and bringing in the next wheel to be bored. The machine, after it is started, goes through a cycle of operations in which the boring bar travels down by rapid traverse to the beginning of the roughing cut, changes to roughing feed, again changes to finishing feed, dwells for the chamber cut and returns by rapid traverse and stops. The machine is suitable for boring all sizes of cast-iron and steel car wheels up to 42 in., and can be arranged to chuck 48 in. wheels if required.



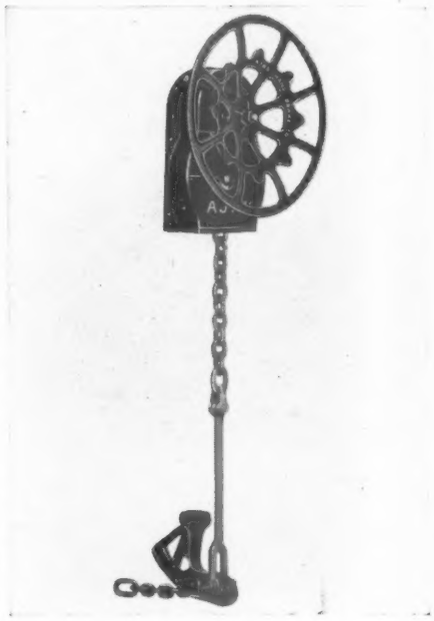
Betts Semi-Automatic Hydraulic-Feed Car-Wheel Boring Machine

Improved Ajax Hand Brake

The illustrations show the improved construction of the Ajax one-hand hand brake being exhibited by the Ajax Hand Brake Company, New York. While retaining the general dimensions of former Ajax brakes, the improvements made recently include forced controlled release, permanent lubrication, supported lateral chain links, and a hand-wheel fastening.

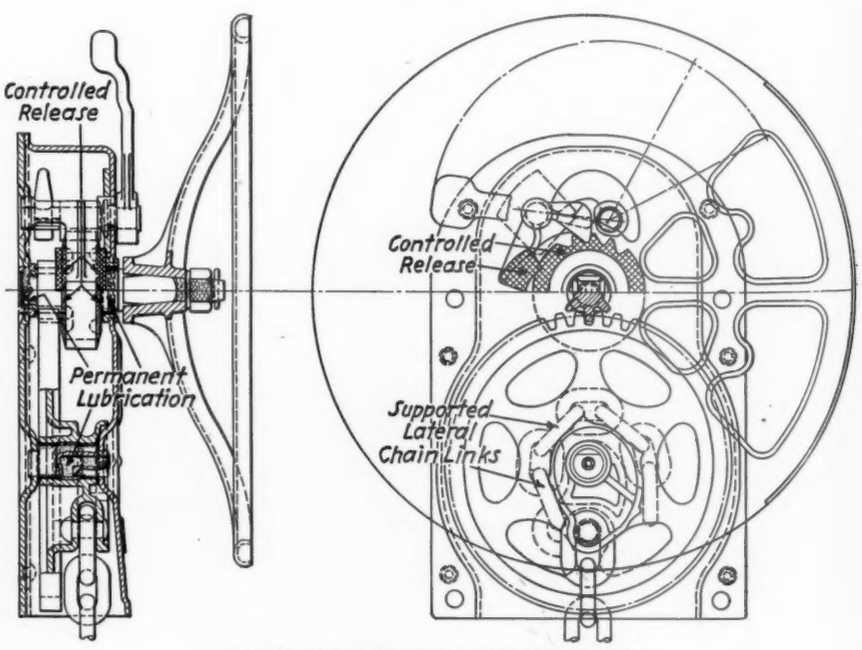
The control of the speed of release, when forced release is given, is accomplished without any extra movement, but by simply continuing to bear down on the release lever. By so doing, the brake can be released at slow speed, and the pressure held, if desired. This is made possible by the tapered surfaces of the pawl and ratchet wheel as illustrated. While giving full control of the speed of release, it has a positive connection between hand wheel and brake chain at all times—a feature necessary for safety.

Attention is called to the lubrication of the main gear axle. When brakes are built a non-wash lubricant is forced into the axle under pressure, filling the hollow axle and cored-out center of the chain drum. If it were desired to renew the lubricant, it can be done by an ordinary grease gun, through the spring oil-hole cover. However, examination of brakes, after service, has shown no loss of quantity or quality of the lubricant. The rear pinion bearing is lubricated by sealing the rear of the housing and filling the counter-bored end of the pinion and sealed-in bushing with a non-wash lubricant. This is giving equally as good satisfaction as the main gear axle arrangement. The front pinion bearing has the grooved bushing filled with this same lubricant when the brake is built; however, this bearing can also be lubricated from the outside when desired.



The Ajax Hand Brake

In addition to all Ajax brakes now being equipped with a 9/16-in. heat-treated chain with a proof test more than 50 per cent greater than A.A.R. requirements, Ajax has the added advantage of having the lateral links supported as shown in the



Details of the Improved Ajax Hand Brake

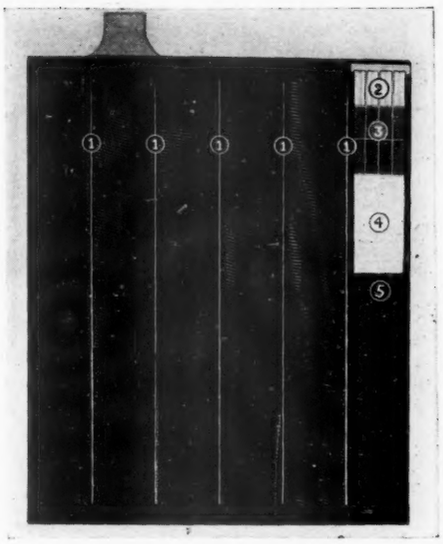
drawing, which relieves them of all bending strain. Bending strain largely limits the life of a chain.

Improvements have been made in the pinion shaft, hand-wheel hub and method of securing the hand wheel. These prevent hand wheels from becoming loose or sagging, or working backwards on the shaft and fouling required clearances. All of these improvements are accomplished without adding a single part except one oil-hole cover.

Feature of USL Durapak Battery

To meet the most severe operating conditions encountered in railway passenger-car service, the Peerless Equipment Company, Chicago, Ill., is marketing a battery known as the USL Durapak, the major feature of which is its positive-plate construction. Constructional advantages of this plate are: (1) "Sectional" construction to withstand expansion and contraction stresses; (2) a heavy one-piece grid for greater mechanical strength; (3) a "machine-pasted" plate for greater plate uniformity; (4) a glass-fiber retainer pad to prevent loss of plate material; and (5) a complete plate shielding to hold the glass-fiber pads firmly against the plate and to protect plates against short circuits. All-rubber "Permatex" separators are used, assuring longer separator life to balance the long life of the positive plates. Negative plates have been improved by tapering the tops and insulating the edges as extra protection against short circuits. This battery is displayed in the Peerless Equipment Company booths.

Cutaway View of the USL Durapak Battery



Positive Plate of the USL Durapak Battery—Numbers Refer to the Features of this Plate Mentioned in the Text

Elesco Injector—A Correction

The Elesco exhaust-steam injector exhibited by the Superheater Company and described on page 1004D61 of the June 17 Daily Edition of the *Railway Age* will handle water as hot as 105 deg. F., not 150 deg. F. as stated in the last sentence of the first paragraph.

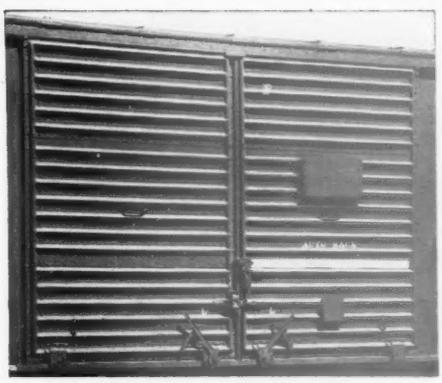
Corrugated-Steel Doors for Box Cars

Included in the exhibit of the Youngstown Steel Door Company, Youngstown, Ohio, is the corrugated steel door for box cars, manufactured by this company. The doors are built of a metallic panel formed of 13-gage copper-bearing steel sheets reinforced by outwardly extending horizontal and vertical corrugations and by steel backing plates extending across and riveted to the door panel on opposite sides of the vertical and top and bottom horizontal corrugations.

The margins of the door are reinforced by rolled structural members. A reinforcing secured to the front vertical margin of the door co-operates with a front door stop to provide an effective door seal. An angle reinforces the top horizontal margin of the door, its horizontal leg extending inwardly and over-lapping a J-shaped header to weatherproof the top edge of the door. The rear vertical margin is reinforced by a sealing strip and buffer angle. The sealing strip and spark strip, secured to the rear door post, weatherproof the rear vertical edge of the door, which is protected by the buffer angle. The bottom horizontal margin is reinforced by an angle. Youngstown corrugated steel doors are spark and weatherproof, are constructed to meet all service demands and afford a maximum strength at a minimum weight.

Although any type of door fixture may be used with the doors, Camel roller-lift fixtures have been used successfully. The use of the roller-lift fixtures permit the bottom door reinforcing angle to rest upon the track at all times except when the door is being opened or closed, thereby weatherproofing the lower edge of the door. Also, movement of the door is resisted and its weight is carried directly by the track, thus relieving the two 3½-in. forged rollers of the lift fixture from the weight of the door and from wear.

These rollers have grease-packed roller bearings and are mounted upon cold-rolled steel pins carried by housings journaled eccentrically with respect to the pins in brackets fastened to the lower corners of the doors. The door is raised upon the rollers by pulling downwardly on an operating lever engaged with one of the housings and when raised may be easily moved. The door lowers automatically when the lever is released and again rests upon the track.



Youngstown Corrugated-Steel Car Door With Camel Roller-Lift Fixtures

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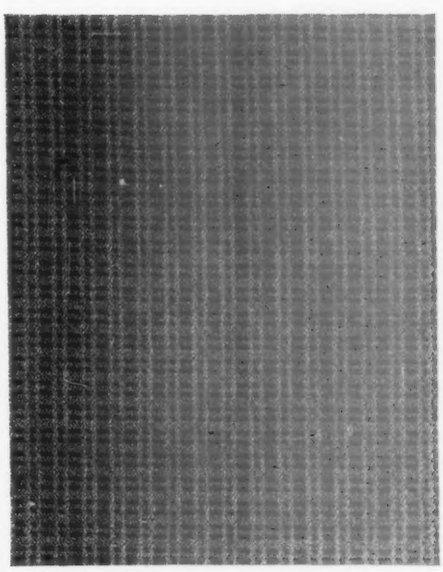
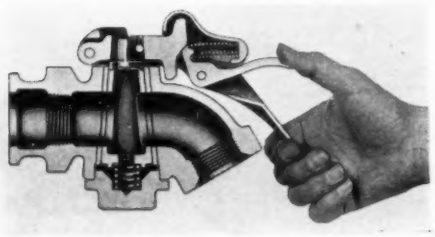


Close-Woven Check Velmo Car Upholstery of In-Cut and Un-cut Design Giving the Appearance of a Soft Overplaid—Exhibited by L. C. Chase & Company, New York

Double-Locking Angle-Cock Handles

Handles for self-locking angle cocks, one of which is of the double-locking type, designed to provide additional safeguard and to insure longer life, have been developed and all being exhibited by the Westinghouse Air Brake Company, Wilmerding, Pa. This design embodies a latch, incorporated within the handle body and projecting above the grip, which must be depressed, as by the trainman's thumb, to permit raising the handle by the fingers to unlock and turn the cock key, thus making it impossible to open or close the cock by safety chains or with the foot.

The spring force used for this additional lock also serves, in conjunction with adjusting screws, to eliminate loose movement and consequent wear sometimes caused by vibration while the car is in motion. Moreover, the hinge pin is of generous size and length to provide a large bearing surface. The socket is of the re-enforced split type with a rivet which engages a notch in the key, holding it securely in place. These several features all combine to increase service life and decrease maintenance cost of the handles. The present standard single-locking type is improved by providing a re-enforced split socket and large hinge pin, to provide the wear-resisting characteristics.



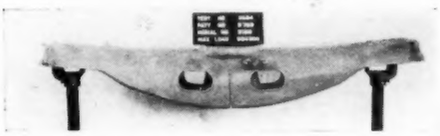
Double-Locking Angle-Cock Handle Cannot Be Unlocked by Safety Chains or by the Foot

High-Tensile Cast-Steel Car Parts

Among the exhibits of the Buckeye Steel Castings Company, Columbus, Ohio, is a 6-in. by 11-in. truck bolster of high-tensile cast steel equipped with a strut cylinder for empty and loaded brake equipment. Cast-steel car parts including side frames, truck bolsters, couplers and draft yokes are now being made by this company of high-tensile light-weight steel, since truck side frame and bolster of grade-B steel are limited to combined vertical and transverse stresses of 16,000 lb. per sq. in., while high-tensile steel parts are correspondingly limited to 25,000 lb. per sq. in.

This increase in allowable fiber stress does not permit a proportional reduction in weight for two reasons: (1) The thickness of sections, especially in the lighter capacities, is limited by conditions requisite for the production of sound castings, and (2) all the members are not structural members and are therefore not proportioned by stress calculations. Even with these practical limitations it is possible to effect a reduction of 17 per cent to 25 per cent of the weight of the truck castings involved, depending on the capacity of the truck—the higher capacities of course being subject to the greater proportional reduction in weight. The percentage of weight reduction of the complete truck depends largely on what can be accomplished in reducing the present weight of wheels, axles and brake parts, which parts constitute about 70 per cent of the total weight of the truck.

Static-test results of a bolster for a 6-in. by 11-in. truck, manufactured by the Buckeye Steel Castings Company of high-tensile steel to meet A. A. R. tentative test specifications, are given in the accompanying table.



Bolster of High-Tensile Steel for a 6-In. by 11-In. Truck After Static-Load Test

Solenoid-Operated Remote-Control Valve

The Gold Car Heating & Lighting Company, Brooklyn, N. Y., is exhibiting a solenoid-operated universal remote-control valve for controlling the admission of steam in train steam lines. The valve will operate on either alternating or direct current, 110 volts or lower, and may be controlled automatically by a thermostat or manually by a switch. The valve is normally closed and constructed for continuous duty. It will close against steam pressures up to 35 lb. and is said to be instantaneous in action and silent in operation. To date the valves are manufactured in the globe or straight-way type in ¾-in. and 1-in. sizes.

Steam-Heat Regulator

Another steam-heat regulator, No. 448, shown in the illustration, has been developed by and is included in the exhibit of the Vapor Car Heating Company, Chicago. This is now being extensively used on light-weight streamline trains.

To meet the problem of substantially decreased steam pressures from the head end to the rear of long passenger trains, the Vapor Company introduced, some time ago, a constant-pressure valve to be applied ahead of Vapor regulators and thus assure uniform steam delivery to all regulators regardless of their location in train. The use of this constant pressure valve proved so satisfactory and economical that it has now been built into a single device combining the principles of the well-known Vapor system regulator with the features of the new constant-pressure valve.

Vapor Regulator, No. 448, with Built-In Constant-Pressure Feature

The No. 448 Vapor regulator has been particularly designed for use on light-weight trains. It admits uniform pressure of steam at all times; makes unnecessary any change in regulator adjustments, regardless of whether at the head-end or the rear of the train; prevents wasteful blowing of steam through regulators, and reduces wire-drawing and steam wear on regulator parts. By relieving the usual strain on diaphragms occasioned by high pressures against regulators, the life of diaphragms is considerably extended.

This regulator incorporates the same diaphragm which has been in standard use in Vapor regulators, and thus requires no additional expense for stocking renewals.

Static Test of High-Tensile Truck Bolster for 6-in. by 11-in. Truck of Tentative A.A.R. Specifications*

	Tentatively acceptable	Ultimately desired	Results of test
Transverse:			
Deflection at 101,000 lb., in.	0.120†	0.100†	0.0685
Set at 192,000 lb. in.	0.025†	0.025†	0.0030
Side Bearing:			
Deflection at 149,000 lb., in.	0.080†	0.070†	0.0515
Set at 240,000 lb., in.	0.025†	0.025†	0.0070
Center Plate:			
Deflection at 149,000 lb., in.	0.120†	0.100†	0.0840
Set at 288,000 lb., in.	0.025†	0.025†	0.0070
Maximum load, lb.	528,000‡	528,000‡	604,200

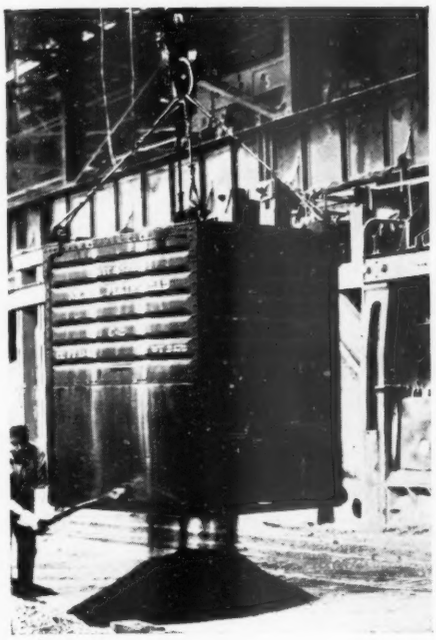
* Truck, complete with two dead-lever fulcrum brackets, weighs 806 lb.

† Test results not to be greater than these values.

‡ Test results not to be less than these values.

Containers for Small Size Bulk Materials

The Youngstown Steel Door Company, Youngstown, Ohio, is exhibiting containers for shipping bulk materials of relatively small sizes which in the past have required large handling expenses at destination. One container, for shipping dolomite, is completely waterproof and is constructed of corrugated steel sheets to withstand the severe service requirements demanded of this type equipment. This dolomite container is equipped with a weatherproofed hatch door 18 in. by 20 in. in the roof for loading, and a rotary-type discharge valve located at the apex of the slope sheets in the hopper bottom designed to secure controlled flow and partial discharge of the material. Two 4-in. discharge openings extending the width of the container are controlled by a single valve which can be operated from either end by a removable lever. The operating lever is designed so that it cannot be applied or removed from the end of the operating shaft except when the valve is in closed position. Therefore, the operator is compelled to close the valve after discharging its contents. The dolomite container is designed for use in conjunction with a single-drum hoist. Its capacity is 134 cu. ft., and it is 7 ft. long, 4 ft. 1⅞ in. wide, 7 ft. 4½ in. high and weighs 2,470 lb.



Youngstown Bulk-Material Container Being Emptied at Its Destination

The other container developed by this company is of the same general type as the dolomite container just described, but was designed for transportation of lime. The roof of this container is equipped with a weatherproofed double-hatch door having a clear opening in the roof of 4 ft. 11½ in. by 2 ft. 11 in. to facilitate loading and trimming. The hopper bottom of the container is equipped with a rotary valve of the controlled-flow type located on the apex of the slope sheets and having a single opening 14⅞ in. wide extending the width of the container. The capacity of the container is 134 cu. ft. It is 7 ft. 10 in. long, 4 ft. 1⅞ in. wide, 7 ft. 4½ in. high and weighs 2,900 lb.

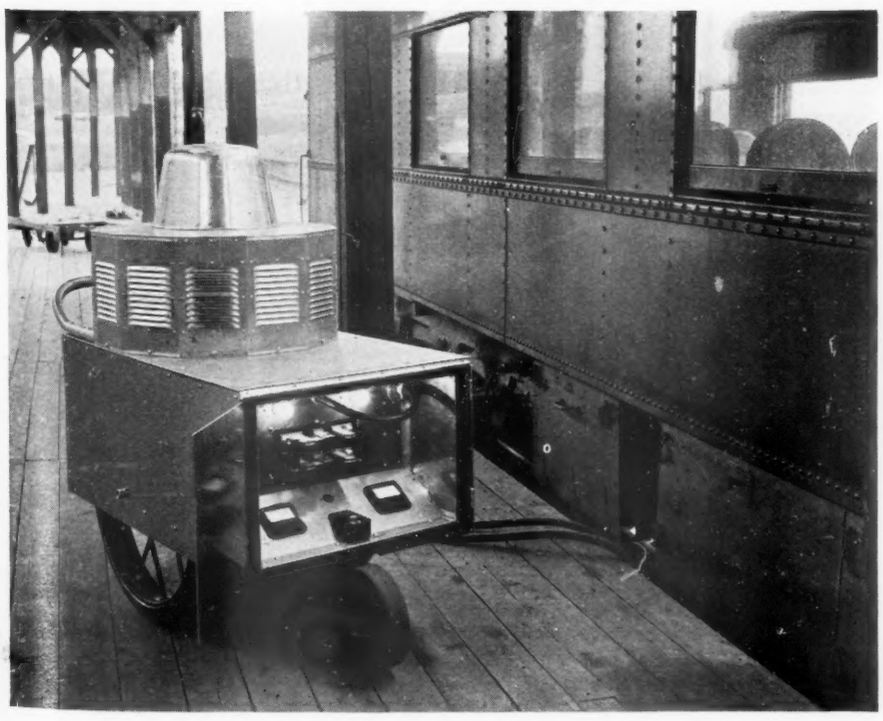
Rectifiers for Car-Battery Charging

Rectifiers for supplying the direct-current needs of passenger cars having large batteries are being exhibited by P. R. Mallory & Co., Inc., Indianapolis, Ind. They are made both as mobile units, such as the one shown in the illustration, and also of smaller capacity without the wheels for mounting on a car.

The units receive their power from the three-phase, 220-volt, a.c. yard circuits, and supply it to the car at any desired d.c. voltage. They are built to give an output of 100 amp. at 80 volts or 200 amp. at 40 volts, with an efficiency of from 50 to 55 per cent. Such a unit is suitable for charging 32 lead-acid cells or 50 Edison cells at the lower rate, and 16 lead-acid cells or 25 Edison cells at the higher rate.

The rectifier units are of the magnesium cupric-sulphide type and are mounted radially in the power dome around a small motor-driven fan which supplies cooling air to the units. A transformer and control equipment are contained in the lower part of the housing. The charger is protected against single-phase and overloading and the frame is grounded by a wire in the a.c. cable. To prevent over-charging, should the a.c. power be left on a long time, a current relay will automatically cut in a series resistor when the current decreases to 30 amperes. The resistor then further reduces the current to 15 amperes. The mobile charger complete weighs approximately 900 pounds. The over-all length is 57½ in., the width 27 in. and the over-all height 49 in.

The on-a-car unit is installed on the car and travels with it. This charger has half the output of the mobile unit and weighs less than 300 lb. It can be mounted over the vestibule or underneath the car.



Mobile Rectifier for Terminal Battery Charging

Stonefelt Insulation For Railway Cars

Johns-Manville, New York, is exhibiting a blanket-type insulation for passenger and refrigerator cars known as Stonefelt. It is composed of fine mineral fibers, specially treated and felted, which are water-repellant and are said to be unaffected by moisture. Being a mineral, it is completely fire-resistant and will neither develop mold or rot.

Johns-Manville Stonefelt Insulation for Passenger and Refrigerator Cars

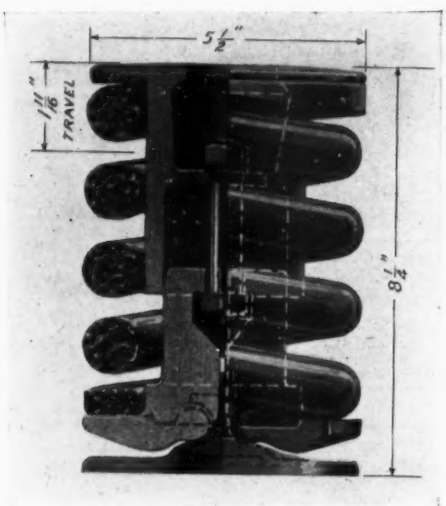
For insulating passenger-car bodies the material is furnished in two forms of flexible-blanket insulation with thicknesses from ½ in. to 2 in. When enclosed be-

tween layers of flame-proofed muslin it is known as type M material and when furnished between two layers of reinforced asbestos paper it is known as type A material. In either of these two forms the material is furnished in bales 36 in. or 72 in. wide, or, if desired, can be furnished cut to size.

For refrigerator-car service Stonefelt is furnished in flexible blanket form between two layers of waterproof and vapor-proof paper or other type of paper, stiched to either side as required. For use on air ducts where the insulated duct will be sealed in a waterproof and vapor-proof envelope, Stonefelt is furnished in flexible form, without covering, in sizes required for easy application. In this form it is designated as type P material.

Car-Truck Stabilizer For Car-Truck Springs

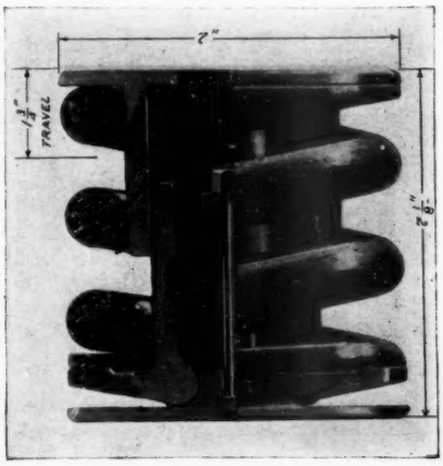
For several years the National Malleable and Steel Castings Company, Cleveland, Ohio, has been developing in the laboratory and in service a stabilizer or snubber for car truck springs. It has long been known that the conventional coil spring suspension



The National F-2-A Stabilizer for Limiting Harmonic Truck-Spring Oscillations

used in freight-car trucks was subject to violent vertical oscillations at certain speeds and that this was responsible for a great deal of damage to lading. The series of riding tests made in the fall of 1933 by the American Railway Association clearly demonstrated the nature of this spring action and showed that the use of properly designed friction stabilizers would prevent the building up of these harmonic oscillations.

The National F-2-A stabilizer was included in these tests and was found to eliminate harmonic oscillation at all speeds covered by the tests. The stabilizer consists of a friction case or housing, a base, two friction levers and a spring which presses the friction levers against the interior surfaces of the housing. One stabilizer is substituted for one coil spring at each bolster end. Any vertical movement of the bolster relative to the side frame causes the levers to generate friction against the interior surfaces of the housing. The stabilizer is so designed that proper frictional contact of its parts is maintained regardless of rocking or lateral movements



The National B-40-50 Stabilizer of 40-Ton and 50-Ton Capacity Cars

of the bolster. All parts of the stabilizer are made of the same heat-treated alloy steels as are used in National friction draft gears, years of experience having shown that they possess the qualities necessary for maximum shock and wear resistance.

The F-2-A stabilizer is used in conventional freight-car trucks. In addition to the F-2-A type, this company has developed the National B-40-50 stabilizer for use in the 40-ton and 50-ton capacity National type-B trucks. This stabilizer is similar in principle and material to the F-2-A stabilizer, being changed only in dimensions to make it interchangeable with one of the coil springs of the type-B side frame.

These stabilizers are included among the exhibits of the National Malleable and Steel Castings Company.

Metal Brake Step With Friction Tread

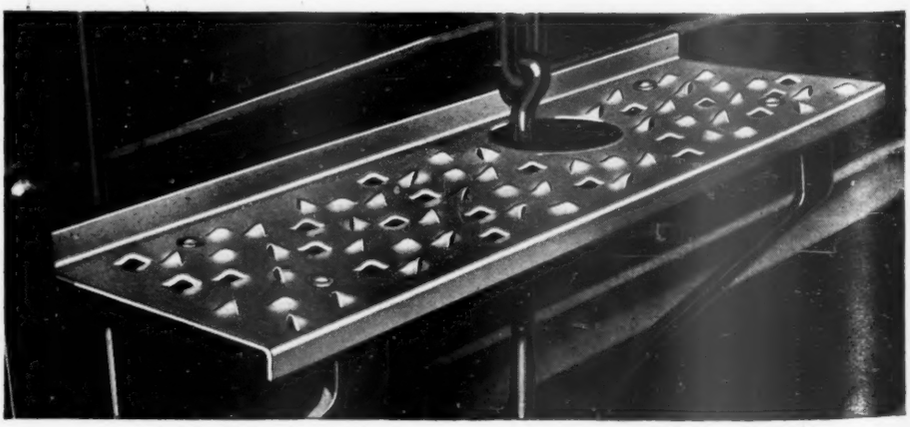
The illustrated friction-tread metal brake step being exhibited by the T-Z Railway Equipment Company, Chicago, has a friction tread created by raised and depressed nibs. These nibs, produced by a special method of punching through the metal, have openings under them to provide drainage and prevent the formation of ice. This method of punching removes no metal from the tread, but, on the contrary, is said to strengthen it. These steps are manufactured from No. 10 U.S. standard-gage open-hearth, or copper-bearing steel, as desired, in any required size and is applicable to any freight-car to meet A.A.R. specifications.

Rivet Removal Nozzles For Oxweld Blowpipes

The Oxweld Railroad Service Company, New York, is exhibiting two types of rivet-removal nozzles designed to speed up

Oxweld Blowpipe Nozzle Permits Removal of Rivets without Damage to Sheets

car rebuilding and reclamation. With the improved technique used in operating cutting blowpipes equipped with these nozzles it is possible to remove rivets at a very rapid rate, some operators being capable of continuous production at 500 rivets per hour. An added advantage of these nozzles is that they permit complete removal of the rivet without damage to the adjacent sheet, thus making possible reclamation of the steel in car-building repairs.



T-Z Metal Brake Step with Friction Tread